FLIGHT
The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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Sept. ...	International aviation week (with competitions) at Brescia, Italy
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EDITORIAL COMMENT

A SECTION of the Press is inclined to be critical of the fact that the Air Ministry is spending £300,000 on extending the barracks and other buildings at Halton, near Wendover. At the time this expenditure was provided for in the current Air Estimates we said that although we were all for proper economy in the public services, we believed the Air Ministry was doing the right thing in extending the most suitable stations in its occupation in order to provide permanent training grounds for the *personnel* of the R.A.F. Halton has been chosen for the non-commissioned ranks, and Cranwell is to be retained for the training of officers of the Force.

Building Up a Permanent Air Force

It is obviously impossible to place the permanent Air Forces of the country on a sound and satisfactory basis unless there is available proper training accommodation for the purpose in view. The latter cannot be provided without the expenditure of a certain amount of money. So much is to be taken for granted, and it is clear that the task which confronted the Air Ministry at the end of the War, when it was agreed what the strength of the permanent Air Force was to be, was the selection of the best possible stations for the purpose. To have carried on with numberless war training establishments, scattered all over the country, might have resulted in the absence from the estimates of the sums which are now being allocated to extensions at the two stations named, but in the end it would have been impossibly extravagant and destructive of training efficiency. It is far and away better to centralise the whole business of training officers and men of the Force, as is done in the other Services, and this is what the Air Ministry is very wisely doing. The sum involved is by no means ruinous. Indeed, we regard it as being surprisingly modest, when we remember that what has to be done virtually amounts to making a fresh start and the creation of an entirely new organisation out of the ruins of the one which served us so well during the War. So far from there being any necessity

for criticism, we think the Air Ministry is doing very well in the matter. No Government Department has shown such a regard for economy, or on the whole expended the monies voted to it so wisely as the Air Ministry. So marked, indeed, has been the desire to economise that we have on occasion had to criticise what has seemed to us a misplaced zeal in what is, on its merits, a most praiseworthy object. We should really like to see the Ministry a little more generous in its expenditure, particularly that side of it which deals with the development of civil aviation. However, it is nothing to do with the specific matters under discussion at the moment.

* * *

The R.A.F. Memorial Fund

The response to the appeal for the Royal Air Force Memorial Fund has been quite good. Up to date a sum of nearly £100,000 has been received, but in order that the full objects of the Fund should be achieved, no less than four times that amount is needed. The Committee, therefore, is making a fresh appeal to the generosity of the public to support the Fund. They confidently claim the assistance of all those interested in the Flying Services, of all those officers, non-commissioned officers and men who are now serving in the R.A.F., of their relatives and friends, and, not less, of those who formerly served in the R.A.F. either as officers or in other ranks, and of all those who wish them well and admire what they have done. Indeed, the Committee claim the support of everyone who values the brilliant deeds of gallantry and self-sacrifice which adorned the history of the Flying Services during the war, and who feels that it would be shameful now to forget what in the day of peril we prized so highly. The Committee ask for contributions which shall be liberal in amount, since the work they have undertaken cannot be adequately performed for a smaller cost than £400,000.

We feel that there is little we can add to this appeal. That we endorse it to the fullest goes without saying. Let us all remember that no branch of the armed forces of the Crown contributed more to our victory over the enemy than did the Flying Services. In saying this we do not wish to be thought guilty of any attempt to belittle the services of any other arm. All were equally magnificent and deserving of all the praise, all the glory, which it is humanly possible to award. But we of FLIGHT are more intimately concerned, naturally, with the wonderful record of the Flying Services in the Great War. It was truly a wonderful record indeed, which covers the whole period of that ghastly five years, in which we saw the Flying Services grow from a mere nucleus of daring pilots, flying machines which were scarcely to be trusted in peaceful flights, to a vast organisation numbering within its ranks many more than the whole peace-time strength of the pre-war British Army. The beginning of the war found flight in its first infancy. The end saw it developed to adolescence. And in between, what a marvellous record there was of daring and skill shown by thousands of youngsters who, many of them, were scarcely out of their boyhood! And when we think of the numbers of these gallant lads who, with their eyes wide open, went to their deaths that Britain might remain Britain, surely it is a small thing that the Committee is asking. Simply that those for whom they died should keep their memory green in the best of all possible ways—by soothing the widow and the fatherless and making smoother the path of those who have given, short of life itself, all that was best of their careers. And even now, when we are beginning to feel the full effects of the War, the sum asked for is surely not beyond the capacity of this great Empire to find. That it will be found we are fully assured, but it is worth while remembering that he gives twice who gives quickly.

* * *

The Air Ministry Trials

Within the next few days the official trials of aero-motors and machines, wisely promoted by the Air Ministry, will begin at Martlesham. As a matter of course, the interest will be technical rather than public, and it is thus impossible to speculate in advance what the results of the tests are likely to demonstrate. Nevertheless, there is a side which is of great interest to the layman who cares to follow the trials with intelligent appreciation. In a general way the public knows that enormous development has taken place in machines and their propulsion since the last trials, which took place on Salisbury Plain before the War. All the records of the War, and of the commercial services which have been established since the conclusion of hostilities, are eloquent of progress, but there is no exact standard of comparison to demonstrate the full measure of progress. The forthcoming trials will afford that standard, and a very interesting one it should be both to the technician and to that section of the general public which takes more than a superficial interest in the development of flight and the flying machine.

There is another object, too, which these trials should serve. While it is perfectly true, as we have often pointed out, that the sum total of the progress induced by the stress of war is unquestionably enormous, it is not at all certain that this has invariably pursued the lines making for maximum efficiency, as this would be understood by those who are connected with development for peaceful purposes. In this direction efficiency must go hand in hand with a measure of economy, and it must often happen that the former must sometimes be sacrificed to some extent to make way for the latter. In war the exact reverse is the case. Nothing matters at all but super-efficiency, and the very last thing to be considered is economy, especially where it may have an adverse effect on fighting fitness. For six years our designers and engineers have bent all their skill toward the evolution of the best types for war, and it will be difficult to get them out of the habit—if it should turn out to be that this is necessary at all. We have added this last qualification because it is not at all certain, yet, that in seeking the best for war they have not also partly succeeded in the discovery of the best types for peaceful development. We have to bear in mind that even now we are only on the veriest threshold of development in aviation, and in the light of present knowledge it seems certain that the dividing line between the best war and the best peace machines is a very narrow one indeed, if we eliminate the fast, light types of fighting machines and regard alone such machine-types as the big bombers which were the evolution of the closing year of the war. It may well turn out to be that this is the type *par excellence* for commercial purposes, further developed, as a matter of course, but still the type.

Again, in the matter of engines. The War resulted in the evolution of wonderful motors, giving a power

Paignton, S. Devon, as seen from an Avro seaplane.

output per pound weight which would have been voted impossible five years before. This, generally speaking, was accomplished at the expense of considerable complication of construction, which in turn made the engine very costly to produce. Again, this mattered not at all during the War, but it may be questionable if the type is exactly what we want commercially. It may be found much better to sacrifice some proportion of power output—meaning slower machines with less climbing ability—in favour of less complication and lower cost of production. These are some of the factors which have a very distinct bearing on such tests as those to be carried out by the Air Ministry during this month and next. We look forward with great interest to the results of the trials, which cannot but be of the very greatest value to the industry and the country.

* * *

The Future of British Oil

There can be no aviation industry unless there are adequate supplies of oil fuel available. That, we are aware, is merely a truism, but it seems necessary to state it for the reason that it does not appear to be as well appreciated as it might be. The shipping and motor trade interests are fully alive to the importance of the question of fuel supplies, but hitherto those associated with the development of flying seem to have allowed the matter to drift. Yet they are fully as concerned with the question of oil fuel as any. Indeed, we may say more so if we accept the prophecies we hear from day to day of how aviation is ultimately to take the place of other methods of transport.

If the maximum development is to take place, the industry will have to interest itself equally with others in the collateral development of native fuel resources. By that we do not necessarily mean that it will have to interest itself financially or even actively in any other way. We know by experience, however, that nothing is done in this country except under pressure of public opinion, and we hold that in so vital a matter as that of our future supplies of oil fuel there is need for creating that pressure at once and all the time. A fortnight ago it was officially stated that some success has attended the effort to discover free oil in Great Britain and that there is actually one well which is producing steadily about five tons of crude oil per day. That is something in the way of evidence that oil actually exists, though we understand that the oil which is being produced from this experimental boring is not promising in the matter of the lighter elements, and is not of the class from which motor spirit is producible in any quantity. But apart from free oil resources, which will no doubt be developed automatically, there are others to which attention must be directed. Coal is the principal of these. It is simply appalling to think of the wasteful methods which are pursued in the use of this staple fuel. Millions of tons are burnt every year in open grates and furnaces without any regard to the enormously valuable products which are being wasted in the form of smoke and unconsumed gases. Fuel oil, motor spirit, all the tar products, sulphate of ammonia and half a dozen other products of extreme value are simply dissipated to the four winds, yet on every hand we are being told that one of the most vital problems we have to solve is that of home-produced oil fuel. We look forward to the time when all this will compulsorily cease, when we get a really enlightened and far-seeing Government, which will care more for the future of the country and the Empire than for political buffoonery. Why should not an Act of Parliament be passed, making it an offence, after a certain number of years, to allow of conversion of appliances for heating, to burn a single ton of raw coal? Properly treated, all the by-products can be extracted from coal and a smokeless fuel left over which actually gives out some 50 per cent. more heat units, weight for weight, than the raw coal. Why not, then, insist upon the distillation of all coal before use for industrial and domestic purposes?

Then, there are the shales, which ought to be developed on scientific lines, under a proper scheme of Government encouragement. During the War we are informed that more than one interested group offered to supply large quantities of oil fuel for the Navy if the requisite permission could be obtained for the erection of distillation plants. They were turned own. Admittedly, there may have been justification then, because the labour and materials which would have been absorbed were better employed in other directions. Matters are different now, and it would seem that one of the best methods of encouragement the Government could employ now would be to call for tenders for home-produced fuel for the Navy, to be contracted for, say, in 1923. We should then at least see whether the war proposals to which we have referred were serious or not. Regarding the whole situation it would seem necessary that all interested in the future of home-produced oil fuel must get together and work towards a common goal, else we shall get nothing done.

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The Royal Air Force Memorial Fund

ELSEWHERE in this issue will be found a list of the donations and subscriptions which have already been given to the Royal Air Force Memorial Fund. It will be seen that the response to the appeal of H.R.H. the Duke of York has been a generous one. It falls, however, very far short of the total—£400,000—which the Committee has decided is the minimum upon which they can embark upon the work they have planned. The Committee claim the support of everyone who values the brilliant deeds of gallantry and self-sacrifice which marked the history of the Flying Services during the War, and who feels that it would be shameful to forget what we then valued so highly. The Committee therefore renew their appeal for the Fund, and ask that donations should be forwarded to the Secretary of the Fund, at No. 7, Iddesleigh House, Caxton Street, S.W. 1.

Coastal and General Air Charts

IT is hereby notified that the Coastal and General Air Charts prepared by the Admiralty during the War for the use of R.A.F. pilots have now been placed on sale to the public at one shilling and sixpence per sheet. The index sheets to the series are priced at one shilling.

The Coastal Air Charts cover the coasts of Great Britain and Ireland on the scale of 1 in. to 3 nautical miles (Air Chart Index A) and the Southern and Eastern shores of the North Sea from Ostend to Blaavand Pt. (in Denmark), and the Cattegat, on the scale of 1 in. to 5 nautical miles (Air Chart Index B). The General Air Charts cover a slightly larger area, and range in scale from 1 in. to 10 nautical miles to 1 in. to 30 nautical miles (Air Chart Index P).

These air charts, which are constructed on Mercator's projection, measure approximately 20 ins. by 18 ins. They show lights and fog signals, buoys and beacons, sites of wrecks, and the direction of the flood and ebb streams; soundings are given in fathoms; conspicuous objects on land are also shown for navigational purposes. The signs and abbreviations used on air charts are contained in Air Chart Index Z.

The agent for the sale of these air charts and index sheets is Mr. J. D. Potter, 145, Minories, E.1.

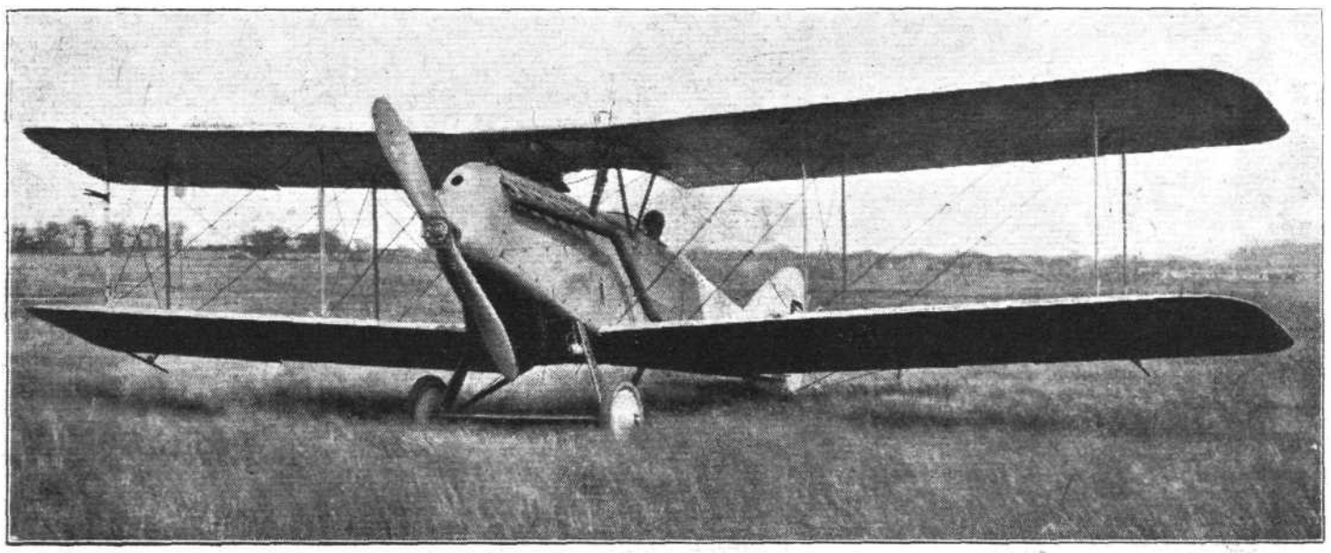
(Notice to airmen, No. 83.)

FLIGHT

THE AIR MINISTRY COMPETITION AT MARTLESHAM

Some Notes on the Machines Entered

ON Tuesday of this week the competitions for the Air Ministry prizes, totalling £64,000, commenced at Martlesham Heath, near Ipswich. The rules for the competition were published in our issue of April 22, 1920, and a list of the firms who have entered machines was given in our issue of last week. Altogether 10 firms have signified their intention of participating in the competitions for land machines, and 5 firms are entering for the Seaplanes (Amphibians) competition, which commences on September 1.



The Austin "Kestrel," 200 h.p. Beardmore engine

THE SMALL MACHINES

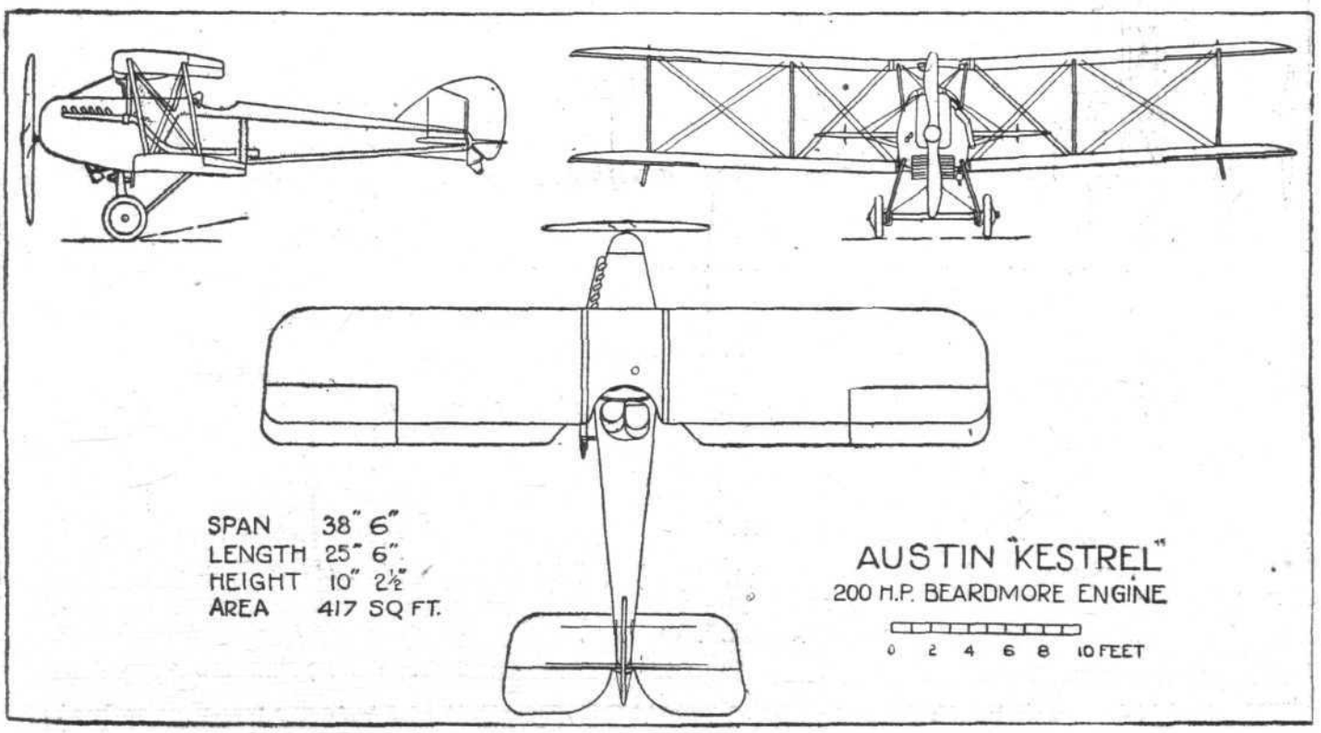
This includes aeroplanes with seating accommodation up to six persons (excluding crew). The following firms have intimated their intention of entering machines in this class: Austin Motor Co., Ltd., Wm. Beardmore and Co., Ltd., Bristol Aeroplane Co., Ltd., Westland Aircraft Works, A. V. Roe, Ltd., and Sopwith Aviation and Engineering Co., Ltd.

The Austin "Kestrel" 200 h.p. Beardmore Engine

The Austin "Kestrel" is a two-seater, side-by-side biplane of more or less orthodox design. The object kept in mind by its designer, Mr. Kenworthy, has been to provide a machine combining strength and durability with comfort. As the seats are "sociably" arranged, conversation between the pilot and his passenger is facilitated, which may be an advantage for school work. Also to the private owner who pilots his own machine it will often be found that this seating arrangement is more congenial than the tandem, where conversation can be carried on by use of a telephone only.

In the construction of the machine metal has been largely employed. Thus the *fuselage* is built-up of steel tube *longerons* and struts, much after the fashion of the Austin "Whippet" exhibited at Olympia, which is expected to reduce the difficulty of keeping the body true. One version of the "Kestrel" has also steel tube wing bracing in place of the usual streamline wires, but we understand that the machine to be flown at Martlesham will have the orthodox bracing.

Especial attention has been paid to the comfort of pilot and passenger, who have in front of them a wind-screen of ample proportions, which is said to protect them completely



from wind and rain. The cockpit is not, however, enclosed in the ordinary sense of the word.

The undercarriage is of somewhat unusual design, although in outward appearance it is of the simple Vee type. The wheel axle, instead of resting in the angle of the Vee, as is usual practice, moves up and down in a slot in the lower end of the front legs. These, it should be pointed out, are built up of two tubes which come close together at the top, where they are attached to the *fuselage*, but are some distance apart at the bottom to give room for the axle. The two tubes forming each front strut are enclosed in a fabric casing so as to reduce head resistance.

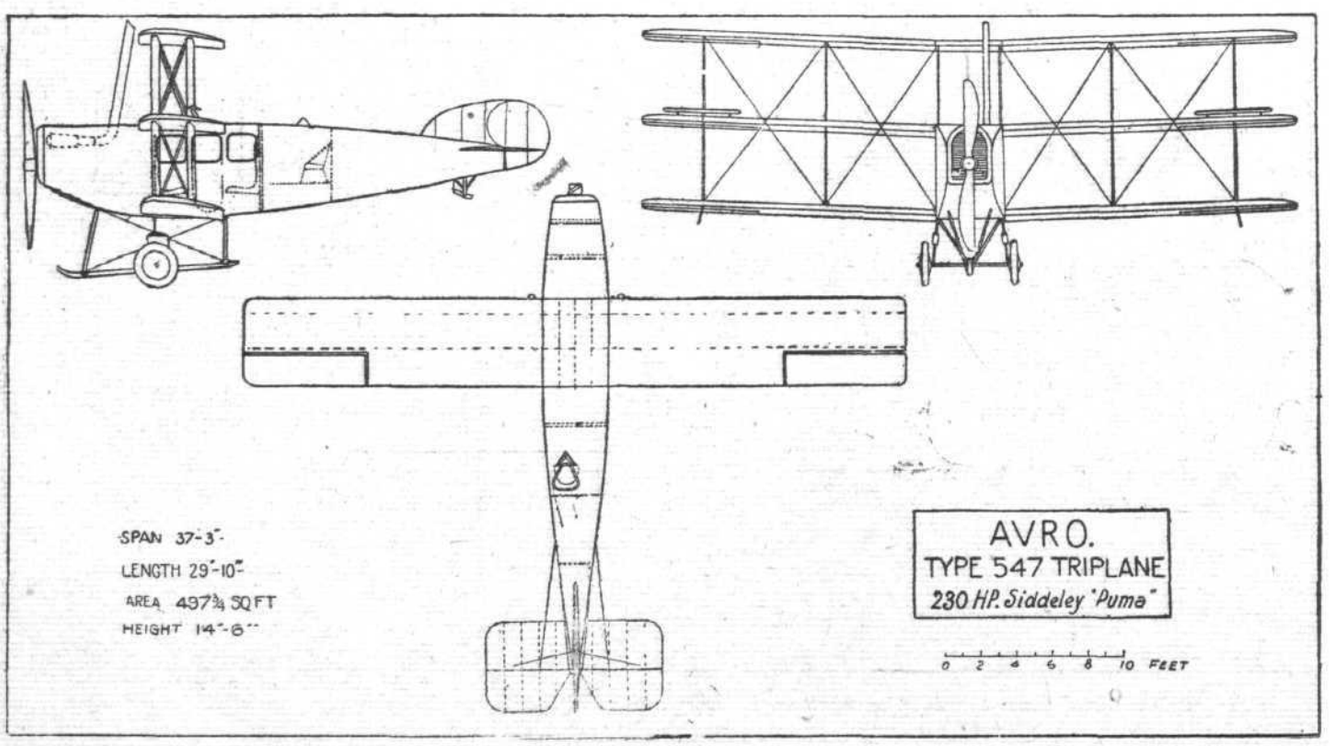
The engine fitted is a 200 h.p. Beardmore, which gives the "Kestrel" a speed of between 100 m.p.h. and 110 m.p.h., and a climb of 5,000 ft. in 5 mins. and 10,000 ft. in 12 mins. The landing speed is in the neighbourhood of 35 m.p.h., the wing area being 417 sq. ft., and the total weight 2,650 lbs. The wing section is R.A.F. 15. Sufficient petrol is carried for a duration of 4½ hours at cruising speed.

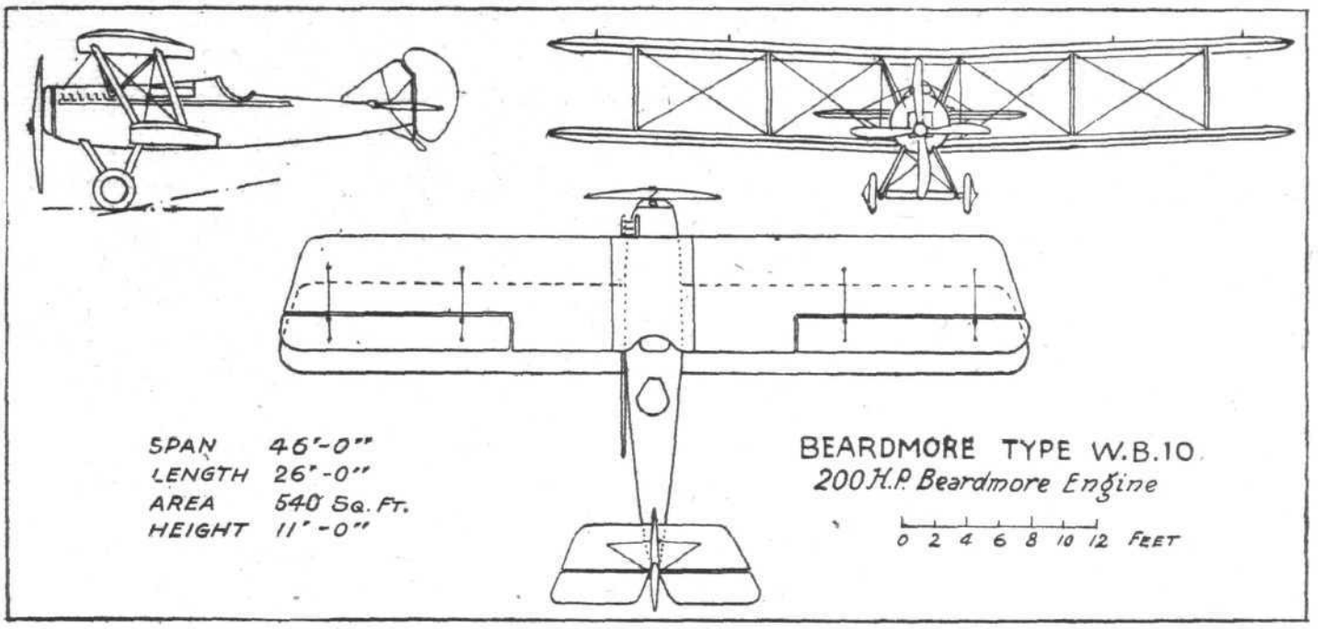
The Avro Triplane
240 h.p. Siddeley-"Puma"

As this is the machine exhibited at the recent Olympia Aero Show, and described in our columns at the time, no very detailed reference to it is required here. The chief feature of the machine, it may be remembered, is that it is built of standard Avro parts throughout, a fact which greatly reduces first cost and facilitates replacements of broken or damaged parts. It is a vertical triplane, designed for carrying four passengers in addition to the pilot. The cabin, in which the passengers sit in pairs *vis-à-vis*, is extremely comfortable, and great care has been taken to ensure, not only thorough ventilation, but also the maintenance of an agreeable temperature. The pilot sits aft of the cabin, on the port side, with his head projecting above the flat top of the *fuselage*.

The engine is a 240 h.p. Siddeley-"Puma," with which the machine has the following performance, carrying full load: Speed, ground level, 98 m.p.h.; at 3,000 ft., 95.5 m.p.h.; at 5,000 ft., 92.5 m.p.h. Economical cruising speed at

The Avro Triplane, 240 h.p. Siddeley-"Puma" engine





1,000 ft., 83 m.p.h. The climb is as follows: To 1,000 ft., 1.9 mins.; to 5,000 ft., in 10.2 mins., and to 10,000 ft. in 28 mins. The power loading is 15.83 lbs. per h.p., and the wing loading 7.63 lbs. per sq. ft. The landing speed is about 52 m.p.h. The petrol consumption at 85 m.p.h. cruising speed at 1,000 ft. altitude is 12 gallons per hour. Our photograph shows an earlier model, but there are no great alterations.

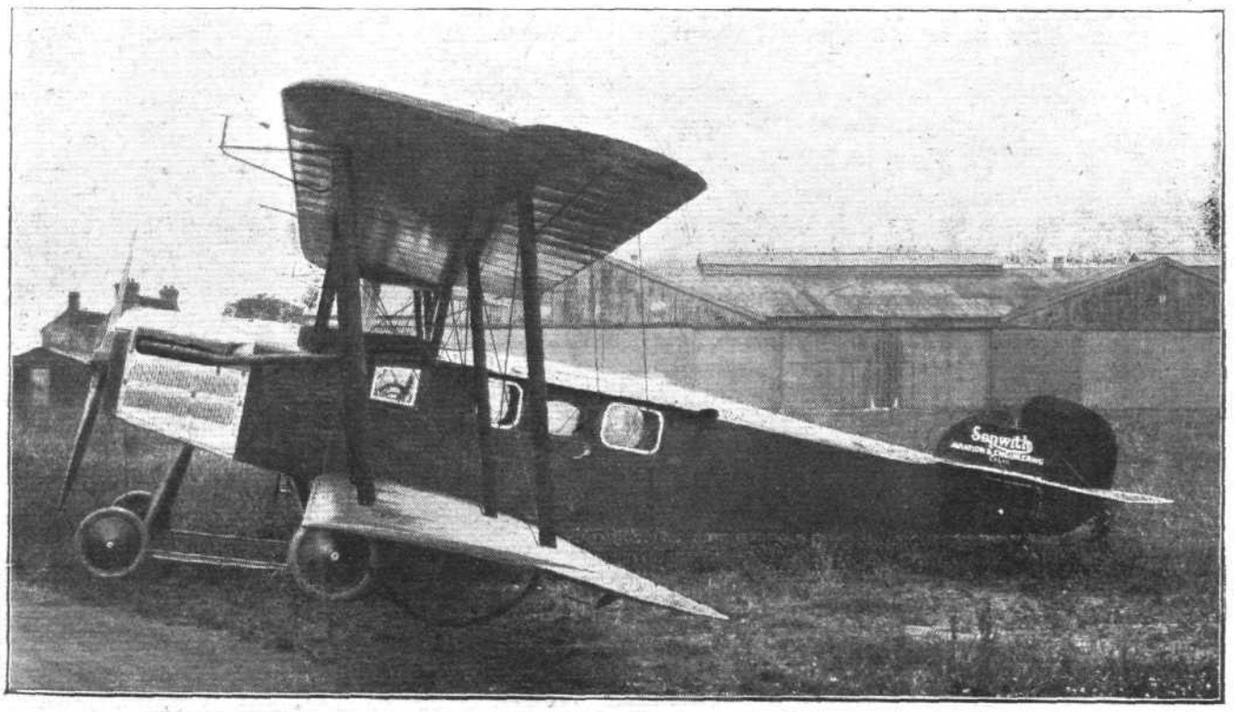
The Beardmore W.B. 10
200 h.p. Beardmore Engine

Little information is available regarding the machine entered by Wm. Beardmore and Co., Ltd. It is, however, believed that this machine will be the W.B. 10 which was to have been exhibited at Olympia, but which was not ready in time to be included in the firm's exhibits. The W.B. 10 is a two-seater tractor biplane of orthodox design, and is chiefly remarkable for the fact that it is built of metal throughout. This refers to the Competition machine. The standard is fitted with wings of the usual composite construction. The power plant will be a Beardmore engine, but at the moment of writing it cannot be stated whether a 160 h.p. or a 200 h.p. engine will be fitted. We hope to be able to give a fuller description of this machine in a subsequent issue of this journal.

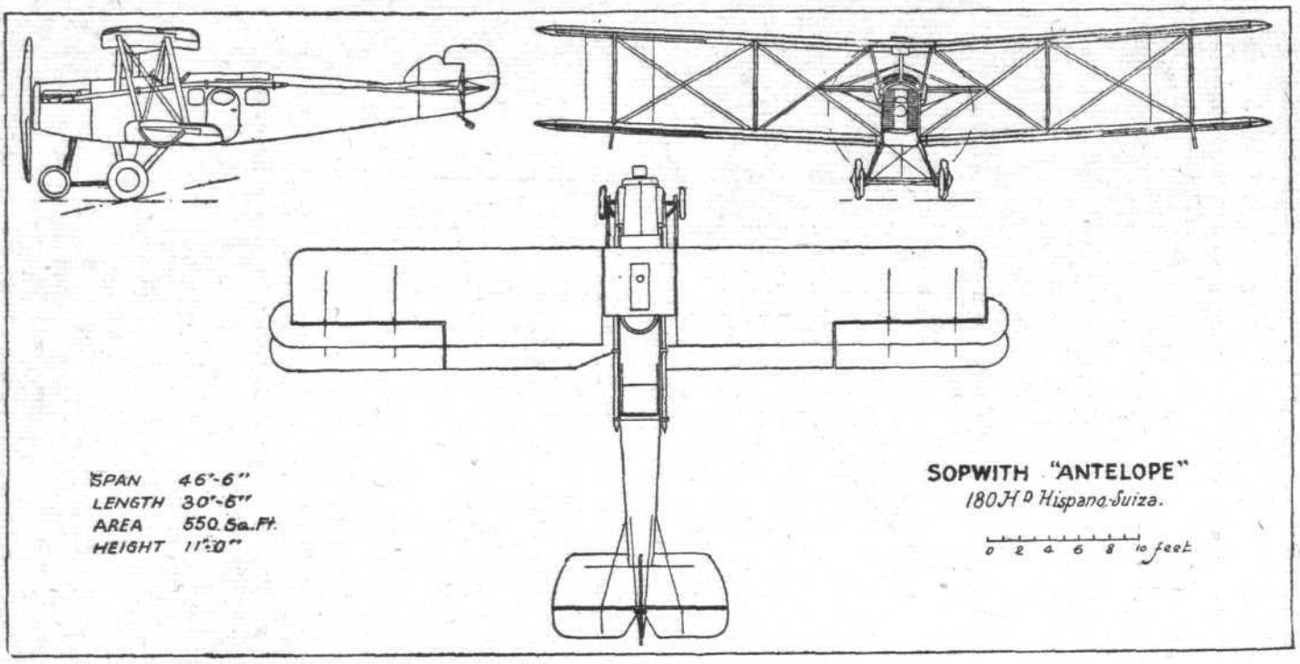
The Sopwith "Antelope"
180 h.p. Hispano-Suiza

The machine entered by the Sopwith Aviation and Engineering Co. is the "Antelope" exhibited at Olympia. A few minor alterations have, we understand, been made to various parts, but the machine is essentially as shown at Olympia. One difference will be noticed, however, in the undercarriage. This is of the four-wheeled type, an extra pair of wheels having been fitted since the show. It may be remembered that one of the tests to be made at Martlesham consists in landing over obstacles 50 ft. above the ground and coming to rest inside a circle marked out on the ground. As side-slip landings are not permitted, and the machine must be brought to rest after the shortest possible run, special arrangements have been made on several of the machines entered for pulling-up quickly, and the extra pair of wheels on the Sopwith "Antelope" may be expected to form part of such a scheme. What the nature of the arrangement is on this particular machine cannot be stated at the moment.

The "Antelope," it may be remembered, is a cabin tractor biplane, with the pilot situated in front of the cabin, where his view is reasonably good. The cabin seats two passengers, one facing forward and one aft. The back-rest of the aft



The Sopwith "Antelope," 180 h.p. Hispano-Suiza engine



seat is hinged, and when folded down forms a raised seat which allows the passenger to sit with his head outside. The sliding panel in the roof is provided with a wind-screen, so that when travelling "outside" the passenger is protected against the wind. Particular attention has been paid to the accessibility of the engine. The two aluminium side panels are hinged along the bottom *longeron*, and fold down after undoing a few bonnet fasteners, thus giving easy access to the Wolseley Hispano engine.

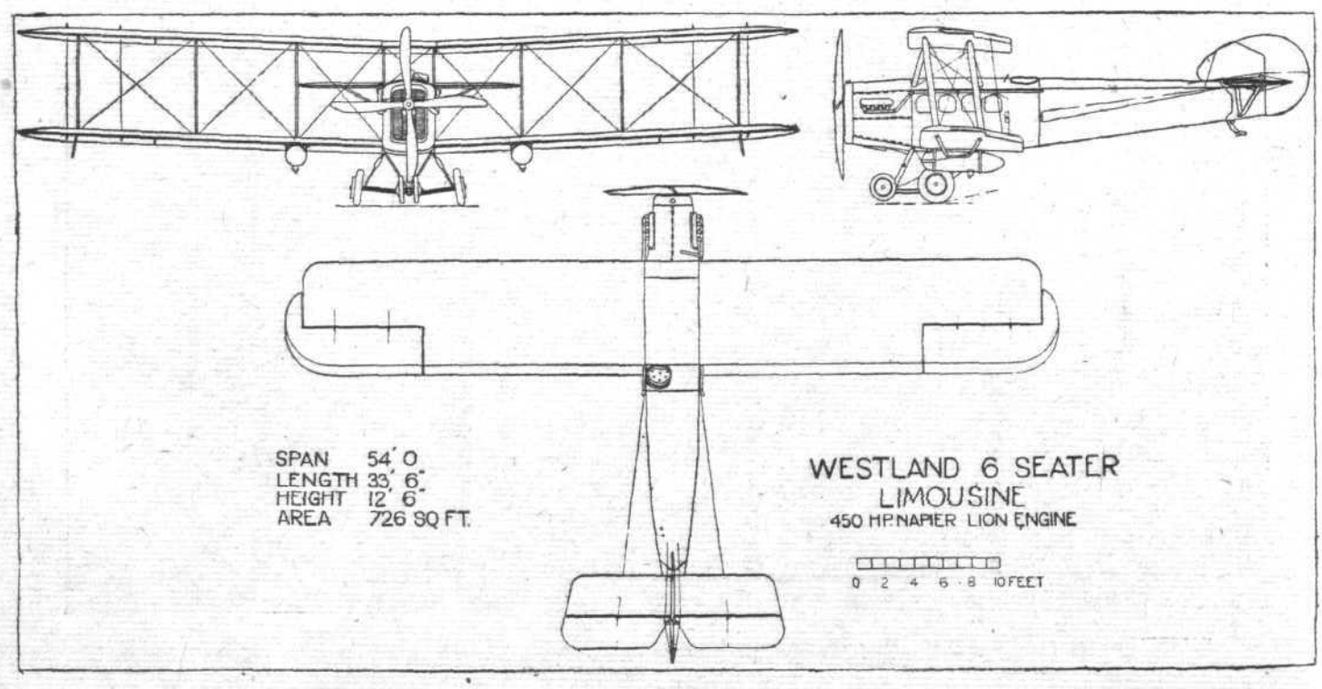
The span of the machine is 46 ft. 6 ins. and the length 30 ft. 6 ins. The total wing area is 550 sq. ft. The maximum speed is about 100 m.p.h. and the cruising speed 85 m.p.h. The landing speed is approximately 38 m.p.h., and the machine climbs to 5,000 ft. in 7½ mins. Fuel is carried for a range of about 450 miles.

The Westland 6-Seater Limousine
450 h.p. Napier "Lion"

Generally speaking, the machine entered by the Westland Aircraft Works of Yeovil is similar to that firm's well-known standard four-seater Limousine. It is, however, a considerably larger machine, and seats five passengers instead of the three of the standard machine. Also the power plant is a 450 h.p. Napier "Lion" in place of the Rolls-Royce and Hispano engines fitted in the smaller model. In general arrangement, however, the Competition machine follows the well-known Westland. That is to say, the cabin is between the planes, and the pilot is seated to the left of and slightly above the aft passenger. This arrangement impresses one as quite a good solution, giving the pilot a good enough view without placing him so far back as to upset his "feel" of the machine.

The engine is the 450 h.p. Napier "Lion," which has already a reputation for reliability and smooth running. The engine mounting is of tubular construction, cross-braced with steel cables and extremely rigid, and the whole engine unit is separated from the machine by a fireproof bulkhead of asbestos covered with aluminium sheet. This is a point well worthy of notice, and throughout the design and construction every care has been taken to avoid any possibility of fire.

As a further protection the petrol tanks are carried under the wings. This the designers consider better than using



any form of fireproof tank in the *fuselage*, and it also has the additional advantage of being readily accessible. Each tank carries 44 gallons while a small gravity tank in the top plane holds a further 9 gallons. This is approximately sufficient for 4½ hours' flight. The petrol is fed by means of wind-driven pumps from the main tanks up to the gravity tank. The excess from this tank is returned to whichever tank is being used. A flow meter shows whether the system is working correctly. Each tank is fitted with a petrol gauge which can be read from the pilot's seat.

The question of accessibility and ease of replacement is one which has been carefully studied throughout the machine. The tanks are very accessible for filling.

The undercarriage is worthy of special notice. It is very strongly constructed, at the same time having great shock-absorbing power. The two rear wheels are fitted with band brakes operated by a lever in the pilot's seat. These brakes greatly reduce the length of run necessary after landing. There is no danger of putting the machine on its nose as the leading wheels prevent any possibility of this.

The cabin is arranged for five passengers in addition to the pilot who is raised slightly above the level of the passengers so that his head projects above the cabin roof giving him a wide field of view, but at the same time he is in direct communication with his passengers. The instrument board is situated directly in front of the pilot. In addition to the usual instruments there is a starting gear by which he can put the engine in motion without leaving his seat.

The entrance to the cabin for both pilot and passengers is through a large door in the side, and it is as easy to get in and out of as a limousine car. Nine "Triplex" glass windows allow the passengers a splendid view, and ventilation is secured by a louvre which directs fresh air into a diffuser box in the cabin without draught. For heating in cold weather there is a heating box alongside the centre exhaust manifold which introduces hot fresh air into the diffuser box, and the temperature may be regulated at will by the passengers.

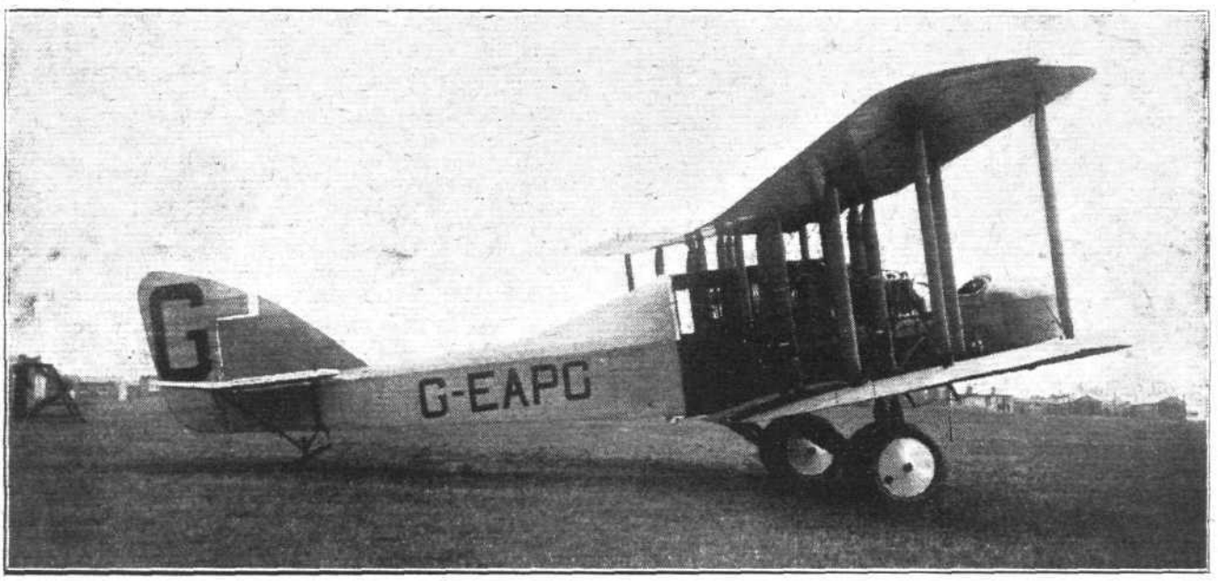
The upholstery is carried out in grey Bedford cord which, in addition to making it comfortable, effectually damps out the noise of the engine, and conversation can be carried on without difficulty. Passengers who have flown in the war type and converted war type machines will appreciate the comfort and absence from noises and smell.

If used for goods carrying, with the seats removed, over 1,000 lbs. weight can be easily carried. No ballast is needed in the machine whatever weight is carried from empty to full load, and the machine can be made to fly level at any speed by means of the tail trimming gear operated by the pilot.

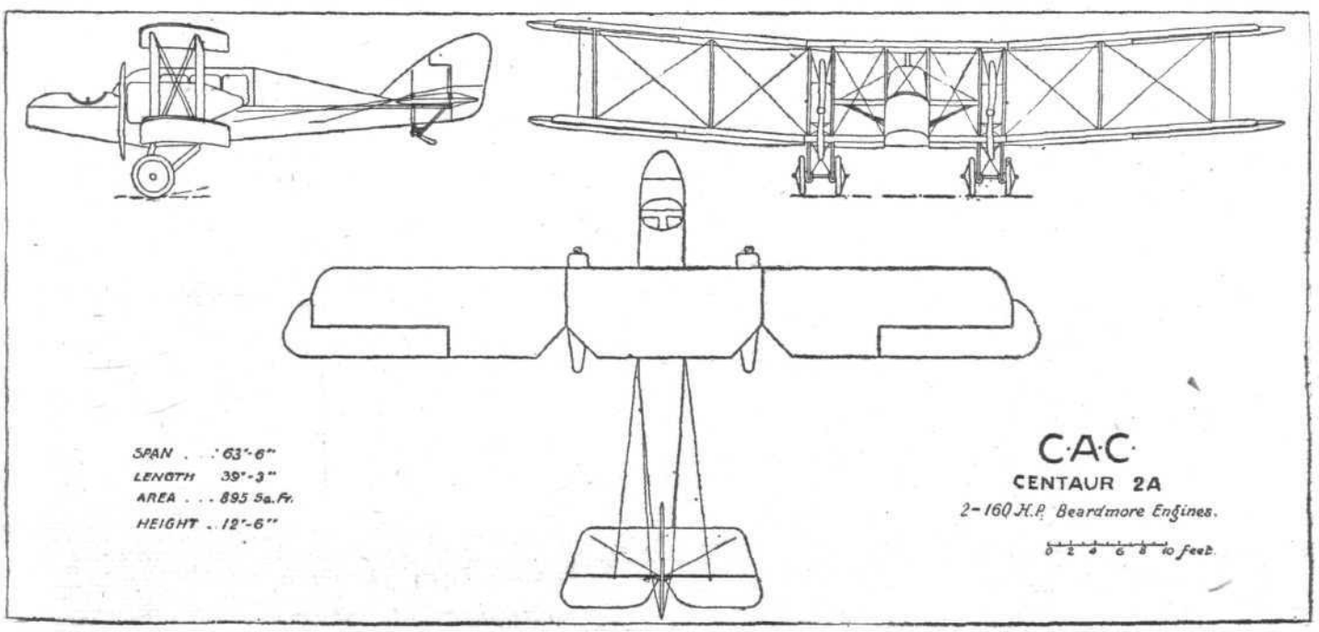
The touring speed of the machine is 100 to 105 m.p.h., and a maximum speed of 120 m.p.h. can be obtained.

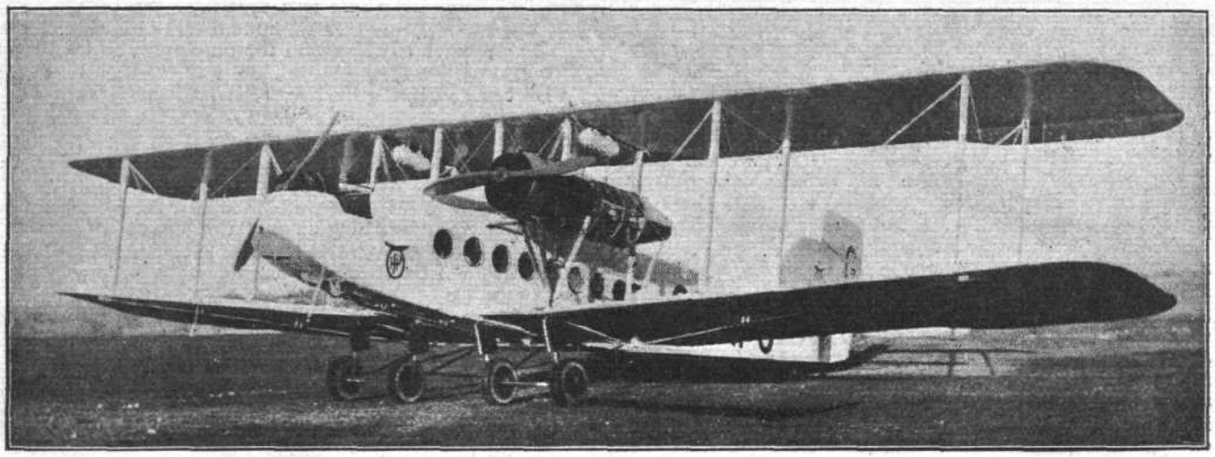
THE LARGE MACHINES

The four firms which have entered machines for the competition in the large class are: Airco, Central Aircraft Co., Handley Page, and Vickers. In the large class are included machines with seating accommodation for seven or more



The "Centaur 2a," two 160 h.p. Beardmore engines





The Handley Page W8, two 450 h.p. Napier "Lion" Engines

passengers, exclusive of crew. At the moment of writing it is not quite certain whether the machine entered by the Aircraft Manufacturing Co. will actually compete. The machine with which it was intended to compete was an Airco 18, but if it does not turn up the competition in this class will be narrowed down to three machines.

The "Centaur 2A"
Two 160 h.p. Beardmore Engines

The machine entered by the Central Aircraft Co., Ltd., is the twin-engined cabin machine known as the "Centaur 2A." It has already been described in this journal (May 27, 1920), and only a brief reference to it will be necessary here. The first machine of this type was of the open fuselage passenger carrier type, and came to grief as a result of the carelessness of a mechanic in rigging the elevator control cables. The present machine is similar to the earlier model except that the passengers' accomodation takes the form of an enclosed cabin. The pilot and one passenger, or an engineer as the case may be, are seated in the nose of the *fuselage* in front of the cabin, the two seats being placed side by side. Inside the cabin seating accommodation is provided for 7 passengers, who obtain a good view through windows in the side.

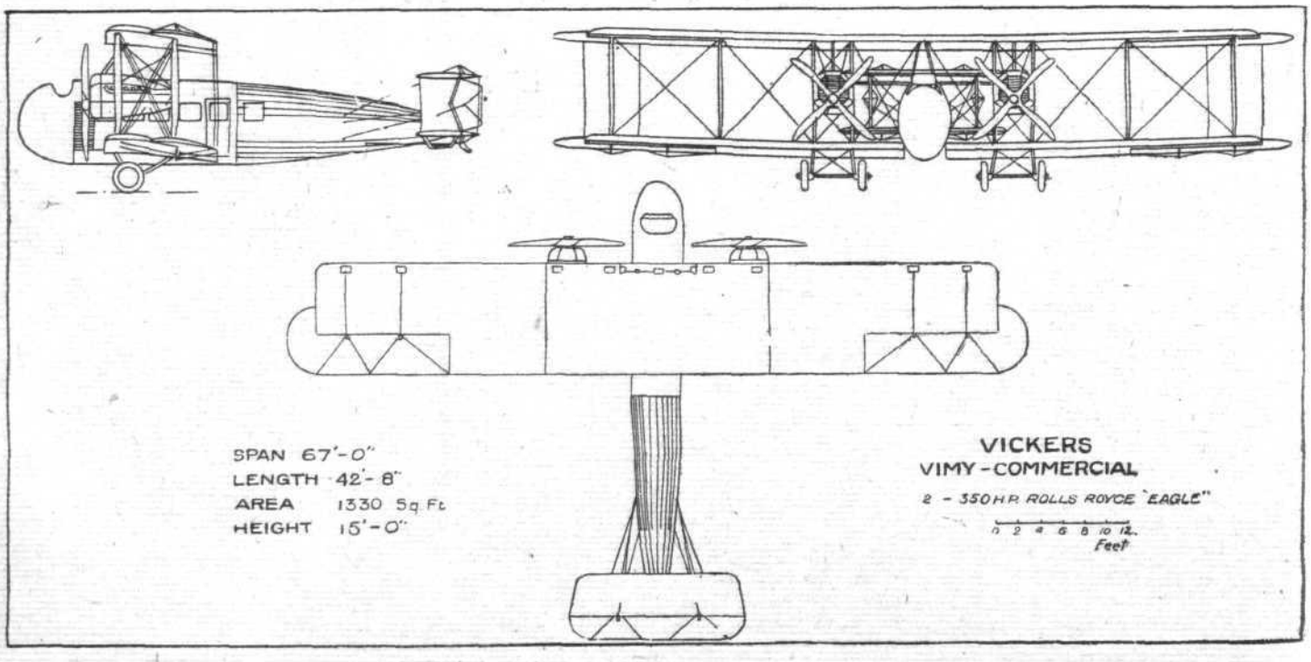
The machine has a total wing area of 895 sq. ft., and the weight loaded is 5,400 lbs. giving a wing loading of 6·03 lbs./sq. ft. The power loading is 16·9 lbs./h.p., and the speed is 85 m.p.h., with a landing speed of 38 m.p.h. The petrol consumption is 25 gallons per hour, which must be considered economical for a load of eight passengers in addition to the pilot.

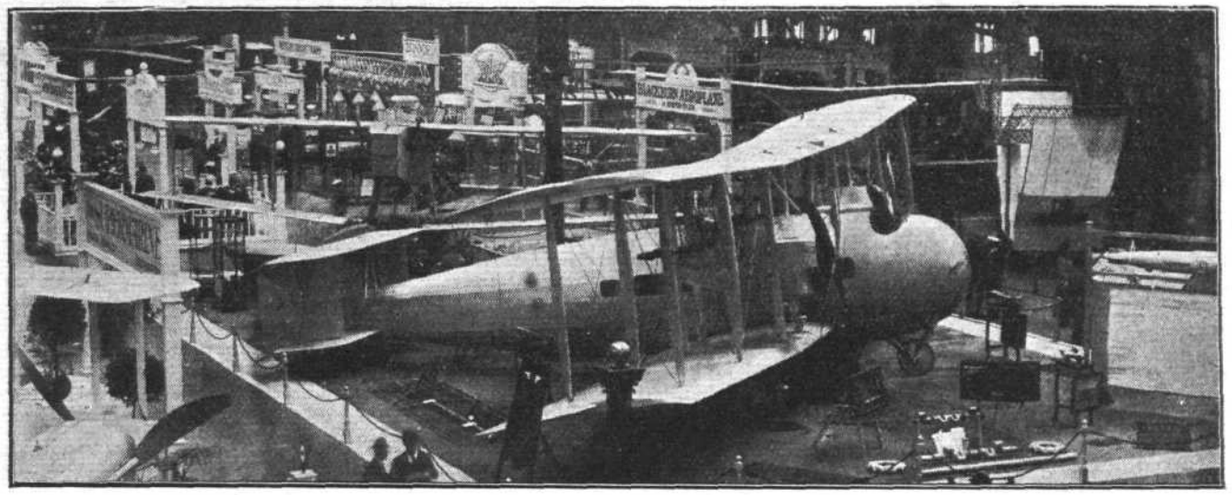
The Handley Page W 8
Two 450 h.p. Napier "Lion" Engines

The W 8 machine entered by Handley Page, Ltd., is already so well-known as to require no introduction here. Suffice it to recall that it is the holder of the world's height record for large loads, having reached an altitude o 14,000 ft. with a load of 3,690 lbs. It is designed to carry 15 passengers inside the cabin, while the pilot and an engineer are placed side by side in the nose of the *fuselage*. If used as a goods carrier, the space available inside the body is 22 ft. long by 6 ft. high by 4 ft. 6 in. wide. The engines are so mounted that they are easy to get at when the wings are folded back, as there is then no bracing interfering with their removal. Later on it is, we believe, intended to fit this machine with a set of the new Handley Page wings, but for the competition we understand the standard wings will be fitted. Otherwise this would have provided a splendid opportunity of demonstrating the capabilities of this interesting wing device.

The Vickers Vimy-Commercial
Two 375 h.p. Rolls-Royce "Eagle" Engines

Another machine which has already been fully described in FLIGHT is the Vimy-Commercial entered by Messrs. Vickers, Ltd. The machine was shown at Olympia where it attracted great attention owing to its comfortable cabin. That the machine is also held in great esteem abroad will be realised when it is recalled that the Chinese Government has placed an order for 100 of these machines, most of the machines having already been delivered. The weight of the machine loaded is 12,500 lbs., and the power loading is 17·8 lbs./h.p., while the wing loading is 9·3 lbs./sq. ft. The speed range is from 45 to 100 m.p.h.





The Vickers Vimy-Commercial, two 375 h.p. Rolls-Royce "Eagle" engines

The Judges' Committee of the Martlesham Competition is constituted as follows:—Major-General Sir F. H. Sykes, G.B.E., K.C.B., C.M.G., Air Commodore H. R. Brooke-Popham, C.B., C.M.G., D.S.O., Brig.-General R. K. Bagnall Wild, C.M.G., C.B.E., Wing Commander W. D. Beatty, C.B.E., A.F.C., Mr. C. B. Cockburn, Lieut.-Col. J. L. Travers, O.B.E., Lieut.-Col. H. W. S. Outram, C.B.E., Squadron Leader V. S. Brown, Squadron Leader V. Sandford, Major P. Bishop, O.B.E., Squadron Leader T. O'B. Hubbard, M.C., A.F.C. (Secretary).

Just as we are going to press it is learned that the Airco 18 has been "scratched," while the Central Aircraft Co.'s "Centaur 2A" has not yet arrived. As the machines, according to the rules, must be at Martlesham Heath on the morning of August 3, it looks as if the competition in the large machine class is confined to two competitors, unless the stipulation concerning being at the aerodrome by the specified time is waived.

This is somewhat disappointing, in view of the substantial prizes offered.

FIRST OPEN COMPETITION FOR R.A.F. BOY MECHANICS

THE Air Ministry announces:—

Under a new scheme which has been established for training boy mechanics in the Royal Air Force, an open Competitive Examination for candidates for entry in January, 1921, will be held by the Civil Service Commissioners on Monday, November 1, at the undermentioned centres:—

Exeter.	Norwich.	Newcastle.
Southampton.	Manchester.	Glasgow.
London.	Leeds.	Edinburgh.
Bristol.	Hull.	Aberdeen.
Cardiff.	Belfast.	Dublin.
Birmingham.		

The examination will include mathematics, experimental science, English composition and a general paper. There will be a minimum of 300 vacancies. Candidates must be the sons of British-born parents and must be between the ages of 15 and 16½ years on January 1, 1921.

A list of candidates for appointment by open competition is kept at the office of the Civil Service Commissioners and the necessary entry forms can be obtained on application to the Secretary, Civil Service Commission, Burlington House, London, W. 1, after August 2. The last day on which applications can be accepted is Thursday, September 9.

Boy mechanics, Royal Air Force, are attested for twelve years' service from date of entry, made up of ten years' regular Air Force Service and two years in the reserve. They receive three years' preliminary training in one of the skilled Air Force trades, which include those of carpenter, coppersmith, draughtsman, electrician, fitter, instrument maker, turner, and machinist, wireless operator mechanic. Throughout the three years' training, eight hours a week are devoted to an educational course, which will include English (language, literature, history, geography and civics), practical mathematics, general science and drawing.

Special attention is given also to boys' physical development, nine hours a week being allotted to drill, physical training and organised games. The health and general welfare of the boys are given careful and general supervision during their period of training.

Every candidate for entry should be in good health and of sound constitution. The medical examination, which is necessarily a severe test of fitness, will not be held until immediately after the successful candidate joins the Training Centre. To avoid eventual disappointment, therefore, and delay in proceeding to some other career, in the event of failure, it is most desirable that before a boy comes forward as a candidate for entry, steps should be taken to ascertain whether he is suffering from any physical disability which might prevent his acceptance on medical grounds.

Boy mechanics will be provided with a free outfit, will be lodged and victualled free of cost and will receive pay at the rate of 1*s*. 6*d* a day until the age of 18, when the rate becomes 3*s*. a day. Those who complete satisfactorily the course of training will receive immediate promotion to the rank of Leading Aircraftman with pay of 5*s*. 6*d*. a day rising to 6*s*. 2*d*. a day. Those who do exceptionally well may be selected for an advanced course and immediate promotion to the rank of Corporal with pay of 7*s*. 9*d*. a day, rising to 8*s*. 6*d*. a day. From this stage there will be opportunities for promotion through the ranks of Sergeant and Flight-Sergeant to Warrant Officer with a maximum rate of pay of 18*s*. a day. In addition to the rate of pay quoted, airmen (including boys) are granted clothing, free rations, and accommodation or allowances in lieu. There is also extra pay for good conduct badges.

From among those boys who complete the advanced course successfully, a few may be selected for Cadetships and if they accept will be admitted to the Royal Air Force (Cadet) College, where they will take the ordinary course of training as Pilot Officers with the Cadets entered by open competition. There will also be opportunities for promotion to commissioned rank at a later stage to those who prove themselves suitable during their service in the ranks.

A pamphlet giving further particulars of the course of training, conditions of service, and systems of entry has been prepared and will shortly be available for issue. Application for copies should be made to the Inspector of Recruiting, Royal Air Force, 4, Henrietta Street, Covent Garden, W.C. 2.

London-Berlin Air Mail

A NETWORK of aerial mail services linking up London, Amsterdam, Bremen, and Hamburg, thence to Copenhagen, or Berlin, or Warnemunde (North German coast), and Malmö (Sweden), connecting at the latter town trains to Stockholm and Christiania, begins on Aug. 10, reports the *Daily Mail* correspondent at The Hague. Airco machines will fly from London to Amsterdam and from Hamburg to Copenhagen, but the remaining routes will be made by the German "Luftverkeer Gesellschaft" machines. Seaplanes will use the Hamburg-Malmö route.

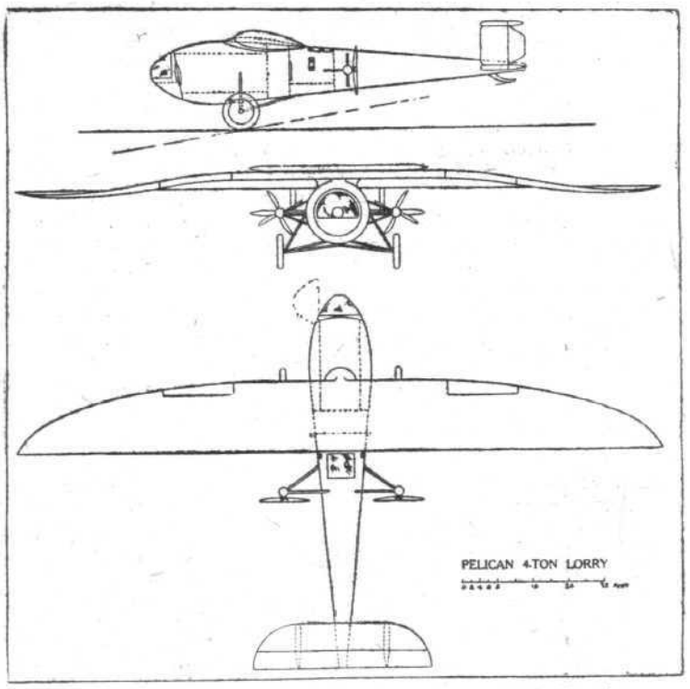
THE "ALULA" WING

A Suggested Application

IN our issue of July 22 we published the wind tunnel data relating to the wing just introduced by the Commercial Aeroplane Wing Syndicate, Ltd., of 34-36, Gresham Street, London, E.C. 2. This wing, the "Alula" wing as it is called by its designers, is, it may be remembered, characterised by a very high maximum lift, coupled with an excellent L/D ratio. The table of data referred to showed that the wing is not a high-speed wing, nor is it a very wide speed range wing. What, then, is its particular usefulness? The answer to this question is furnished by its designers, who point out that it is pre-eminently suitable for carrying heavy loads at moderate speeds. To show one way in which this can be accomplished, the designers have had prepared a design for a 4-ton aerial lorry, the calculations for which have been carried out by Mr. Harris Booth of the Blackburn Technical Staff. There are, of course, a number of different ways of utilising the "Alula" wing, and if desired it can be used in the ordinary biplane arrangement. Mr. Booth has, however, after careful estimates come to the conclusion that the wing will give the best results in the form of a cantilever monoplane. During the full-scale tests carried out by the Blackburn Technical Staff at Brough, it was discovered that the slip-stream had a marked effect on the behaviour of the wing, and consequently the wing of the experimental machine was raised until it was above the propeller disc, as shown in our photo. The machine made a number of test flights piloted by the Blackburn pilot, Capt. Clinch, during which quite a number of valuable data were obtained. For instance, it was found that ordinary *ailerons* were perfectly useless, but fortunately Capt. Clinch was able to obtain sufficient lateral control by using his rudder, and so managed to land safely. A new method of lateral control then had to be devised, and this took the form of two hinged flaps in the leading edge of the wing. It was found that when the flap of the rising wing was pulled slightly it "spilled" the air and at the same time increased the resistance on that wing, tending to swing the machine, so as to give the lower wing greater lift. This, it will be seen, can be accomplished without the use of the rudder, thus virtually getting around the Wright Patent, which covers the use of warp or flaps in conjunction with the rudder.

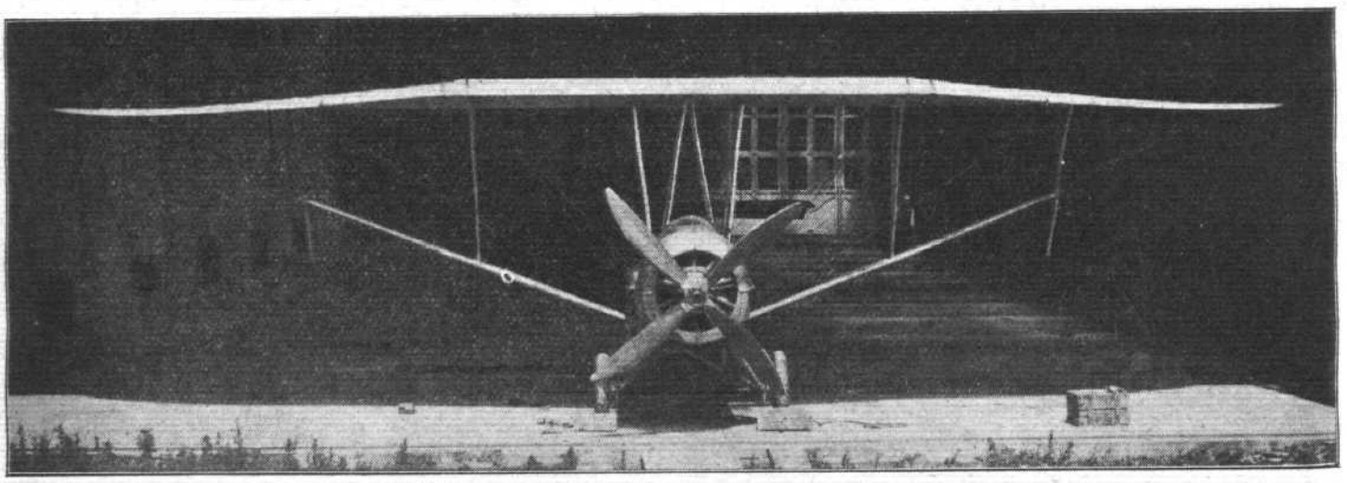
In shape the wing is characterised by a straight trailing edge to which, as seen in plan, the leading edge sweeps back. In front view also the trailing edge is straight, and the leading edge has a negative dihedral which provides the "wash-out" to the tips. The result of this arrangement, in conjunction with the shape of the wing section from point to point, appears to be that end losses are greatly reduced, if not avoided altogether. The consequence is that the wing gives a very great lift (maximum lift co-efficient ·827 abs.) while the maximum L/D is not affected, being as good as that of most other wings (22·9). For machines where great speed range and very high maximum speed are not required this makes for economy of flight, and hence the claim of the designers that the "Alula" wing is best utilised on a heavily loaded, comparatively slow machine; a tramp of the air in fact.

The general arrangement drawings of the "Pelican" 4-ton lorry designed by Mr. Booth are published herewith. It is, it will be seen, of very unorthodox design, being a large cantilever wing monoplane, with two Napier engines placed aft in the *fuselage*, driving the pusher screws through bevel gearing. The pilot is placed in the nose of the body, and his cockpit is hinged to the rest of the *fuselage* so as to swing out sideways. The engineer is aft in the engine-room. The cargo is placed in a cylindrical receptacle moving on rollers, so that loading and unloading can be done in a minimum of time. Constructionally the wings and *fuselage* are both built of frameworks having mahogany planking, after the fashion of modern flying-boat hulls. This, it is expected, will give the machine a greater life than that of the usual fabric-covered machine.



A suggested design for utilising the "Alula" wing

The following is a specification of the machine, a preliminary estimate only, it is admitted, but probably sufficiently accurate to give an indication of what may be expected.



THE "ALULA" WING: Our photo. shows an experimental machine, built by the Blackburn Co. and flown by their pilot, Capt. Clinch, for ascertaining full-size figures for the wing. The high position of the plane is used to get it out of the propeller slip stream

Sizes in Feet

Span	146	Chord	16
Length	84	*Fuselage* diameter	14
Height	22		

Weights in Pounds

Wings	5,100
Fuselage	2,080
Tail	850
Chassis	1,160
Structure	9,190
7½ per cent. addition	690
Tanks	550
Engine and propeller mountings, radiators, silencers, &c.	970
Engines	1,680
Crew	360
Empty weight	13,440
Fuel (London-Paris)	1,660
Cargo (London-Paris)	9,000
Fuel (400 miles)	2,770
Cargo (400 miles)	7,890
Total weight	24,100

Performance

Landing speed	55 m.p.h.
Cruising speed	72 m.p.h.
Climb	410 ft. per min.
Climb on one engine	40 ft. per min.
Cruising revolutions	·80 of normal.
Cruising B.H.P.	·51 of normal.
Cruising consumption	243 lbs. per hr.

Other Particulars

Total weight, lbs.	24,100	Cargo space, cu. ft.	1,700
Total horse-power	920	London-Paris cargo, tons	4
Surface, sq. ft.	1,870	400 miles cargo, tons	3½
Lbs. per sq. ft.	12·9	Gliding angle	1 in 15
Lbs. per B.H.P.	26·2		

It should be pointed out that in calculating the fuel weight it has been assumed that the machine is flying against a head wind of 30 m.p.h., so that probably the machine will actually do considerably better than the figures given by the calculation. The power is such that, fitted with two 450 h.p. Napier Lion engines, the machine is able to climb slightly with one engine running, so that forced landings *en route* should be of rare occurrence. Not only are the engines running at about half-power only most of the time, but in case of a breakdown the fact that the engines are placed in the fuselage will enable the engineer to make adjustments and minor repairs en route.

In addition to the specification printed above, Mr. Booth has got out figures relating to operating costs, from which it appears that on the London-Paris route cargo can be carried for a cost of 2½*d.* per pound. This is surely sufficiently cheap to bring aerial cargo transport within the limits of practical politics, and even this figure can, it is thought, be bettered. The above estimate is based on writing off the machine after one year's service, while it is thought that a boat-built structure will actually last very much longer. At any rate the design would appear to be sufficiently promising to justify manufacturers in getting in touch with the designers of the "Alula" wing, who will be pleased to discuss details, and offer suggestions for other applications of the wing.

ROYAL AERONAUTICAL SOCIETY NOTICES

Office.—Members are reminded that the Offices at 7, Albemarle Street, W. 1, will be closed from July 30 to August 17, during which period the issue of the usual weekly notices will be suspended.

Annual Reports.—In last week's notices it was stated in error that No. 1 of the "Aeronautical Classics" contained a reprint of F. H. Wenham's paper on "Aerial Locomotion." This paper is in the second volume of the Classics; the first volume, which is out of print, being "Aerial Navigation," by Sir George Cayley.

The Secretary is anxious to obtain copies of the Twelfth Annual Report (1877), and the Eighteenth and Nineteenth Reports (1883–1884) which were issued together.

Autumn Session.—The dates of the following lectures have been fixed for the Autumn Session. They will take place at 5.30 p.m. at the Royal Society of Arts, John Street, Adelphi:

October 7 (Inaugural Lecture), "Civil Aviation," by Sir F. H. Sykes.

October 21, "A Comparison of the Flying Qualities of Single and Twin-engined Aeroplanes," by Squadron-Leader R. H. Hill.

Educational Lectures.—In addition to the series of lectures to be given at Sheffield University in October, arrangements are being made, at the request of the Chief Librarian, for one or two lectures in the Fulham Central Library during the coming autumn.

W. LOCKWOOD MARSH,
Secretary.

7, Albemarle Street, W. 1.

Another Flight to Australia Completed

ON the morning of August 2, Lieuts. Parer and McIntosh, on their De H. 9 biplane, safely arrived at Port Darwin, and so completed their flight from England to Australia, which commenced on January 8. The two ex-officers of the Australian Flying Corps decided to return to Australia by air, and entered for the prize offered by the Commonwealth Government, their mount being a De H. 9 bomber, purchased from the Disposals Board. The prize had been won before they could start, however, and they then decided to fly home by easy stages. As a matter of fact their progress was marked by a series of mishaps, and it says a great deal for their perseverance that they have succeeded in completing the trip. Lieut. Parer stated that he had been over eight hours flying from Timor, and there was only one pint of petrol left in the tank when he landed.

"R.33" Over London

WITH the Belgian attaché on board, the British rigid airship "R. 33" left Howden at 10.15 p.m. on July 28, and on the following day cruised to Antwerp, where she was manœuvred for some time over the Olympic Games ground. Returning to England, the airship steered for London, and, coming in over the Crystal Palace from the south-east, crossed the Metropolis at a low altitude and moderate speed, and went off in a north-westerly direction.

French Zeppelin to Fly South

THE hangar at the naval air station at Toulon being nearly ready, the French authorities have ordered the L. 72, the Zeppelin surrendered by Germany to France, to be transferred there, from Maubeuge, on or about August 10. On its way south the L. 72 is to cruise over Paris.

A Franco-Polish Air Mail

A CONVENTION for establishing an air mail has been signed between France and Poland. It is on similar lines to that previously signed between France and Czecho Slovakia, and the two services will be combined over the route Paris–Strasbourg–Prague–Warsaw. The first trip is scheduled to take place on August 15.

A Fast Sweden-Finland Trip

ONE of the aeroplanes belonging to the Swedish Air Traffic Company recently made a very fine performance, flying during stormy weather from Stockholm to Hangö (Finland), a distance of 270 miles, in approximately two hours.

A Race in Japan

FOR a race from Tokio to Osaka and back the Imperial Aviation Society of Japan received three entries, but only two actually took part. One, Huitaro, had a forced landing after flying for half an hour, and was seriously injured, while the other, Yamagata, completed the course in 5 hrs. 38 mins., representing an average speed of 98 m.p.h.

Civil and Military Aviation in Japan

PROGRESS is apparently being made in Japan if the report is true that an aviation bureau has been established, although it is stated that it will be under the direct control of the Japanese Minister for War. It is added that the bureau will also supervise civil aviation.

A U.S. National Race

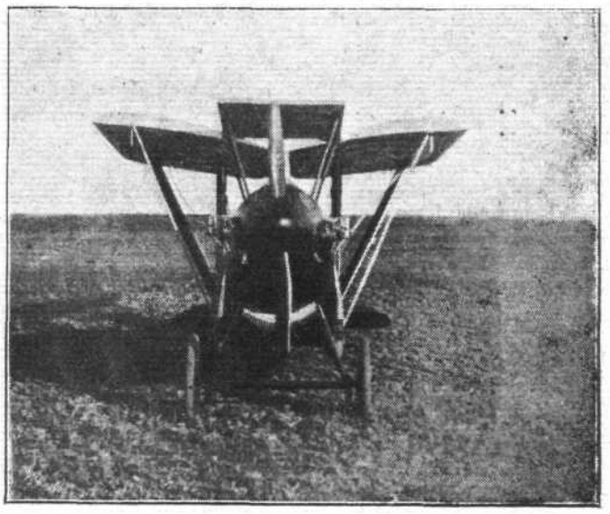
AN aeroplane race from New York to San Francisco for the Pulitzer trophy, which is to be known as the National Aeroplane Race, will be held in October or November.

AN AMERICAN SINGLE-SEATER WITH NOVEL FEATURES

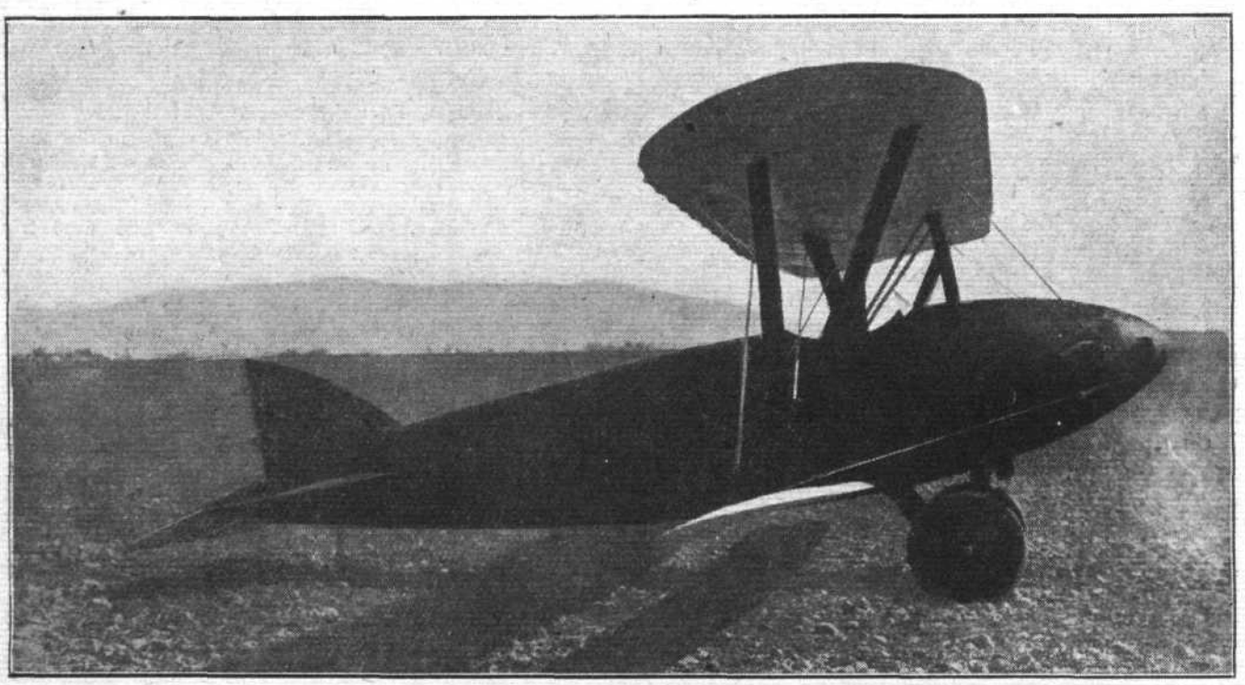
DURING the last few years very little originality in design has been shown by the aircraft manufacturers in the United States. For the most part they have been content to copy European models, generally evolving rather poor imitations at that. Occasionally there are exceptions. One of the chief exhibits at the recent San Francisco aero exposition was a small biplane especially built for pleasure purposes by the Loughead Aircraft Manufacturing Co. of Santa Barbara, California, and there are so many novel and interesting features about this machine, that it is worth describing in detail. The Loughead S1 model, as it is called, is a single-seater biplane with a wing span of 28 ft., and a total weight empty of only 400 lbs. Although there are traces of the well-known German Albatros having been used as a model, everything about this little aeroplane denotes a refinement and finish worthy of the best French and English machines, and lacking in most American craft.

The *fuselage* is of *monocoque* form, consisting of a thin shell of plywood reinforced by transverse bulkheads. Though not very common in England, this type of *fuselage* has long been acknowledged to be the most successful, both on account of its ideal streamline form and its strength in proportion to its weight. Heretofore it has, however, been little used on account of the laborious methods necessary, which made it exceedingly expensive. The shell in the Loughead model is produced by applying three complete layers of plywood to a mould the shape of the body; binding cloth and casein glue being applied between the layers, which are then subjected to a uniform air pressure of 20 lbs. to the square inch, which is maintained over the entire surface until the glue has set. This process produces a wooden shell of a uniform thickness of $\frac{1}{8}$-inch, which is said to be stronger for its weight than any other *fuselage* yet developed. The whole body presents a perfect streamline form from the pot on the propeller boss to the rear end, where it runs into a sharp point beyond the rudder and tail plane, and not ending in the knife-edge common to most European machines.

The upper and lower wings are supported by a V-shaped strut near the wing tips, which is solidly bolted to the upper wing spars and fastened to the lower wing by a simple but rigid pin connection. The most novel and original features of the machine are the air-brake and the position of the radiator. In the former, the lower wing spar is made to pivot at the body, allowing the whole wing to rotate, not only forming a very efficient lateral control, but allowing the lower wings to be thrown into a vertical position which provides, it is claimed, an extremely effective brake, making it possible to stop the plane within from 50 to 75 ft. of the point where the wheels first touch the ground. This brake is operated by a separate lever placed at the side of the pilot's seat. The designers claim that the machine will land at the exceedingly low speed of 25 m.p.h., while its maximum speed is said to be 75 m.p.h. The power plant consists of a 2-cylinder water-cooled motor of only 25 h.p. designed by the same firm. The Loughead motor weighs approximately 90 lbs., has two horizontally opposed cylinders with a bore of $3\frac{5}{8}$ ins. and a stroke of $4\frac{1}{2}$ ins. There are two independent Bosch magnetos, and two high-pressure gear-type oil pumps; the radiator, as noted above, being mounted in a novel position, immediately under the *fuselage*. The fuel tank, of 7 gallons capacity, is located in the centre section of the upper wing. Fuel consumption is claimed at only one gallon per hour, and oil at one-half pint per hour at economical speed. The landing gear is of the usual V-strut and rubber band type with a factor of safety of over 10 to 1. There are only five wires on each side of the body—three flying, one landing, and one drift, all being neatly faired to lessen head resistance. There are no control wires outside the *fuselage*. The propeller is only 5 ft. 6 ins. in diameter, with a pitch of 3 ft. 6 ins. There is a large unbalanced rudder and a vertical tail fin. Lateral control is obtained neither



Front view of the Loughead single-seater Sport-'plane, with wings folded.



THE LOUGHEAD SINGLE-SEATER SPORT-'PLANE: It is fitted with a 25 h.p. 2-cyl. opposed water-cooled engine, and the lower plane is pivoted so as to serve as an air-brake as well as for lateral balancing.

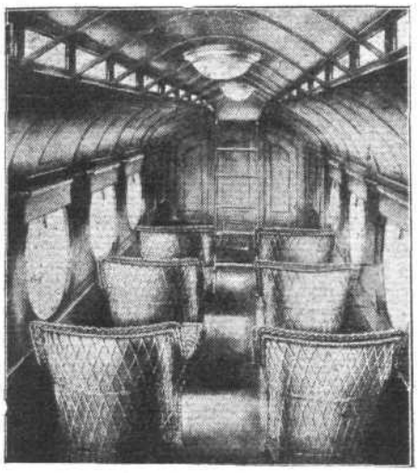
by *ailerons* nor by warping, but by pivoting the lower wing just forward of the centre of pressure, a method eliminating all the lost motion found in the conventional cable and pulley systems.

A special feature which will commend itself to all private owners is the patented wing-folding device reducing the housing space required to such an extent that any good garage or shed 10 ft. by 20 ft. is a suitable hangar.

◈ ◈ ◈ ◈

AN AEROMARINE LIMOUSINE FLYING BOAT

THE Aeromarine Plane and Motor Co., of Keyport, N.J., recently put into service a converted F-5-L type flying boat, fitted up as an "aerial yacht" for passenger work at Keyport. This air yacht—elegantly furnished with two cabins seating 10 passengers, a separate compartment for pilot and pilot-mechanician, and a luggage compartment—was officially launched by Governor Edwards of New Jersey on June 22, at the Aeromarine Co.'s plant.



Interior view of the fore passengers'-cabin on the Aeromarine Aerial Yacht, "New Jersey"

In general characteristics the "New Jersey," as this air yacht is named, is similar to the Navy F-5-L flying boats described in FLIGHT for July 31, 1919, the main feature being found in the arrangement of the cabins—and other modifications.

In the bow of the big yacht, which is painted pure white, is a cockpit for observation purposes, affording an unobstructed view. Just behind this in the top of the hull is a sliding door. This leads into the main passenger cabin, beautifully furnished, roomy, and comfortable. This compartment contains six wicker chairs, arranged two by two, with an aisle between. Each passenger has a circular window of celluloid, 18 ins. in diameter, to himself. A sliding door connects with the front cockpit, so that passengers need not go up the stairs to reach it.

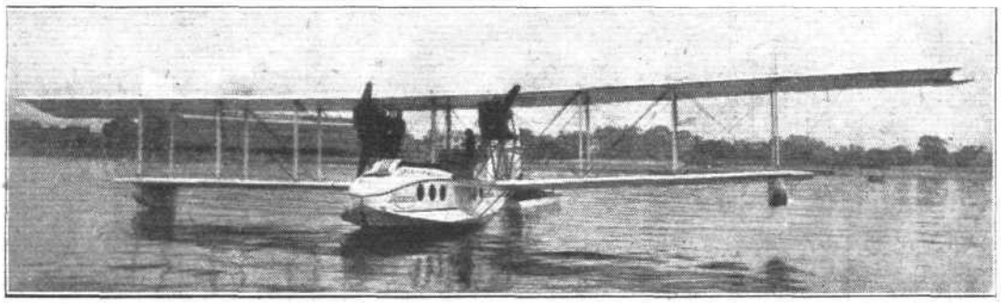
To the rear of the big cabin, but ahead of the front wing beam, is a space for baggage or mail. Behind that is another compartment, corresponding to the chart room of a yacht, in which pilot and mechanic sit together. The roof of their compartment is raised above that of the main cabin, so that they have a clear view ahead. Beneath this compartment are the petrol and oil tanks. The pilot and mechanic are located under the upper wing, close to the two Liberty motors, which are set a short distance on either side of the hull in the gap between the wings. From the pilot's compartment a door opens direct to the lower wing, so that the mechanic can reach the motors while in flight. A dual control system is used to enable a pilot and pilot-mechanician to alternate in handling the "ship" in long flights.

Behind the pilots, and also behind the wings, is another commodious cabin in the hull. This is not quite so large as the main cabin, for it is designed to seat four passengers. Large windows provide a clear view of the surrounding country.

The boat has a high speed of 85 miles an hour, and a low or landing speed of 50 miles. Fuel and oil supply for four hours may be carried, in addition to the full load of 12 persons, each of an estimated weight of 180 lbs., and 620 lbs. of mail, freight or baggage.

The air yacht has an upper wing spread of 104 ft. and a lower wing of 75 ft., giving her a total of 1,397 sq. ft. of supporting surface, not including that of elevators and stabiliser. The height is 18 ft. 9 ins. and length 50 ft. Two Liberty 12-cylindered motors, totalling 660 h.p. and driving tractor screws, are installed. The petrol-carrying capacity is 230 gallons, and oil capacity 20 gallons. Fully loaded it weighs 12,823 lbs., and without passengers, fuel, etc., it weighs 8,456 lbs.

On the occasion of the launch of the "New Jersey," Governor Edwards drew attention to the fact that the first screw-propelled boat to be used in the United States for commercial purposes in 1840 was also named the "New Jersey." This vessel had a length of 70 ft., a beam of 10 ft. and a draught of 6 ft., the propeller being 6 ft. 4 ins. diameter, and its speed of 11 m.p.h. was then considered wonderful. After 80 years the new "New Jersey" presents an interesting comparison, with its speed of nearly 100 m.p.h.—a significant example of the progress made in transport.



Three-quarter front view of the Aeromarine 10-passenger Aerial Yacht (6F-5-L type) "New Jersey"

◈ ◈

German Aircraft and the Peace Treaty

ONE of the conditions of the Protocol, signed at Spa on July 9, under which the German Government secured certain concessions, is that the Germans enforce the Naval and Air Clauses contained in the Treaty and in the Protocol of January 10, 1920, which are still unexecuted, particularly completes by August 5, 1920, the delivery and destruction of all aircraft material, except hangars and hydrogen plant, and by the same date completes the payments provided for in the said Protocol; by February 15, 1921, completes the delivery or destruction of such buildings, hangars, and hydrogen plants as may be specified by the Aeronautical Inter-Allied Commission of Control.

From Airship Station to Bungalows

THE buildings of the aerodrome at West Hythe, Kent, which was used for airships of the Dover patrol, are now turned into seaside bungalows, a restaurant, and a garage and motor repair works.

◈ ◈

The Aerial Derby

As there is a good deal of difference between the Avro "Baby" and the Martinsyde "Semi-Quaver," the regrettable slip which, owing to the rush of going to Press, was allowed to pass last week in the inscription to the pictures on p. 829, could hardly mislead any regular readers of these pages. As a matter of fact the centre picture showed Captain Hamersley on the Avro Baby—not the Semi-Quaver—getting away.

A Japanese Aero Engine Factory

NAGOYA, in the centre of Japan, has the opportunity to become a centre of aero-engineering activity, as part of the munition works, in the suburbs of the city, is to be equipped with tools and machinery from the aviation factory at Astuta. A number of engines of the Salmson type of 250 h.p. have been constructed throughout of Japanese material, and their tests are said to have proved quite satisfactory.

FLIGHT

AUGUST 5, 1920

NAVAL ARCHITECTURE IN AERONAUTICS

By JEROME C. HUNSAKER, Eng.D., Commander, Construction Corps, U.S. Navy

(*Continued from page* 695)

Abstract of Appendix III

Control Surfaces.—I doubt if there is any one part of an aeroplane which has caused more trouble than the control surfaces: rudders, elevators, *ailerons*. The three rudder system of control invented and developed by the Wrights made flight possible. It is fundamental for three dimensional space. All of the experimenters before the Wrights failed for lack of proper control. Consider the machines which did not really fly of Lilienthal, Montgomery, Langley and the other pioneers. As soon as the Wrights showed how to control an aeroplane, any boy could make his own glider. Yet, although the fundamental nature of this discovery is universally recognised, we know little more about the design of such control surfaces than the Wrights taught. Control surfaces are proportioned for aeroplanes and airships largely by judgment and experience. There is no sure calculation in our handbooks, and the designer risks his reputation and the test pilot risks his life on many new machines. For civil aviation it is especially important that machines sold to the general public have adequate control surfaces. This is quite as important as to require adequate factors of safety and apparently not one-tenth so difficult. However, the areas and proportions of control surfaces are the only things not covered by specifications. We depend on the test pilot to state whether he finds the control certain and easy.

When an important feature of design is so largely a matter of judgment and feeling, we look to naval architecture for an analogous problem. The rudders of vessels are made large or small, depending on the manœuvrability desired. The actual design of such rudders is a matter of judgment and experience. For a merchant ship a rudder area from 1/75th to 1/100th the area of the longitudinal section of the ship is found to be quite satisfactory for ordinary steering. For warships the turning circle is a military feature, and to give quick manœuvring a rudder relatively twice as large is used. The exact size and shape of rudder to use for any design are determined from an analysis of the rudder proportions of ships of similar type whose turning circles and general behaviour are known.

Such mathematical theory of the turning of ships as exists

TABLE I.—(*Summary of Tables III–IX.*) *Average Control Surface Coefficients*

No. in class.	Class.	Horizontal tail surfaces in per cent. wing area. (*b*)	Vertical tail surfaces in per cent. wing area. (*v*)	*Aileron* surface in per cent. wing area. (*a*)	Distance from tail hinge to c.g. of aeroplane in terms of mean wing chord. (*t*)	(*th*)	(*tv*)	Aspect ratio (max. span over max. chord).
8	Monoplanes	14·8	6·1	12·5	2·5	37·0	15·2	5·0
20	Single-seater ..	11·8	4·4	12·9	3·0	36·4	13·2	5·9
17	Two-seater non-training	11·7	4·3	12·6	3·2	37·4	13·8	7·3
4	Seaplanes (two-seater)	11·4	4·0	11·3	3·3	37·6	13·2	8·7
7	Triplanes	9·2	3·7	11·2	4·0	36·8	14·8	9·6
12	Twin-engined bombers (biplanes)	11·1	4·2	11·3	3·5	38·8	14·7	9·2
11	Flying boats ..	13·8	6·3	11·2	3·0	41·4	18·9	10·4

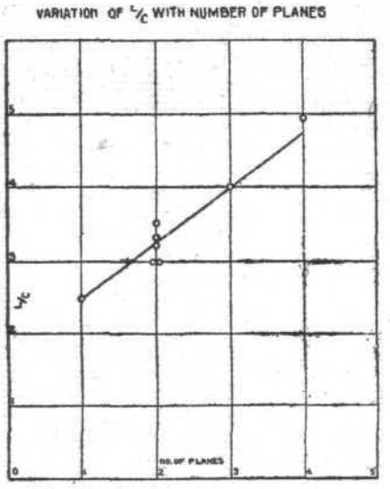


FIGURE I.

TABLE X

Type.	Airship class or designation.	Volume cubic feet (V).	Length overall feet (L).	Maximum diameter (D).	Maximum cross section area (A_X).	Areas control surfaces square feet. Fin.	Rudder (A_R).	Fin + Rudder (A_V).	Stabiliser.	Elevator (A_E).	Stab. + elevator (A_N).	A/A_X.	A_N/A_X.	A_R/A_V.	A_E/A_N.	Coefficients. $K = \frac{A_V L}{V}$	$K_N = \frac{A L}{V}$
Non-rigid.	S.S. Zero	70,000	143	30·0	707	187	43	230	220	64	284	·33	·40	·19	·23	·47	·58
	B-(U.S.)	84,000	160	31·5	780	292	64	356	328	128	456	·46	·58	·18	·28	·68	·87
	E- ,, ...	95,000	162	33·5	882	207	83	290	216	166	382	·33	·43	·29	·43	·50	·65
	O-(Italian)	127,000	177	Irreg.	1,076	322	172	494	10	253	263	·46	·24	·35	·96	·69	·37
	PV- ,, ...	176,000	203	,,	1,450	384	214	598	—	617	617	·41	·43	·36	1·00	·69	·71
	C-(U.S.)	182,000	192	41·75	1,370	342	82	424	420	118	538	·31	·39	·19	·22	·45	·57
	D- ,, ...	186,000	198	41·75	1,370	454	98	552	506	196	702	·40	·51	·18	·28	·59	·75
	C Star	210,000	217	Tri-lobe	1,395	287	67	354	574	134	708	·25	·51	·19	·19	·37	·73
	Chalais Mendon C-M-5	320,000	262	45·7	1,640	581	237	818	474	194	668	·50	·41	·29	·29	·67	·55
	Zodiac (U.S.) ..	328,000	262	50·3	1,990	633	248	881	585	253	838	·44	·42	·28	·30	·70	·67
	Astra	340,000	262	Tri-lobe	1,970	646	216	862	970	323	1,293	·44	·66	·25	·25	·66	1·00
	North Sea ..	360,000	262	,,	2,070	620	122	742	880	244	1,124	·36	·54	·16	·22	·54	·82
	M (Italian) ..	440,000	269	Irreg.	2,460	775	345	1,120	—	647	647	·46	·26	·31	1·00	·69	·40
Rigid.	R-9	889,310	526	53·0	2,206	1,100	576	1,676	2,140	480	2,620	·76	1·19	·34	·18	·99	1·55
	R-23	997,500	535	53·0	2,206	1,400	480	1,880	1,800	480	2,280	·85	1·04	·26	·21	1·01	1·22
	R-29	1,000,000	539	53·0	2,206	1,280	427	1,708	1,266	422	1,688	·77	·77	·25	·25	·92	·91
	R-31	1,560,000	615	65·6	3,380	1,602	458	2,060	1,707	484	2,191	·61	·65	·22	·22	·81	·86
	L-33	2,013,000	643	78·8	4,877	1,405	471	1,876	1,925	580	2,505	·38	·51	·25	·23	·60	·80
	L-49	2,013,000	643	78·8	4,877	1,400	464	1,864	1,896	560	2,456	·38	·50	·25	·23	·60	·79
	R-38*	2,880,000	695	85·5	5,740	1,950	667	2,617	2,204	734	2,938	·45	·51	·25	·25	·63	·71

* Externally balanced surfaces, internally braced

is used in selecting the important variables in the problem, but the analysis results in empirical coefficients.

The naval architect's method is applied to obtain empirical coefficients for the control surfaces of aircraft of the various types in the third appendix to this paper. I have there assembled data for a large number of aeroplanes and airships

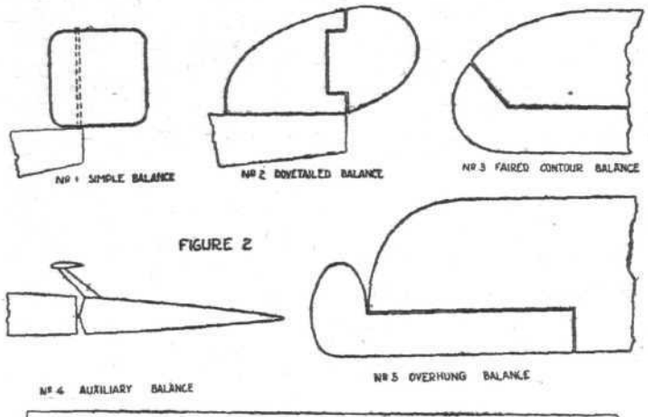


FIGURE 2

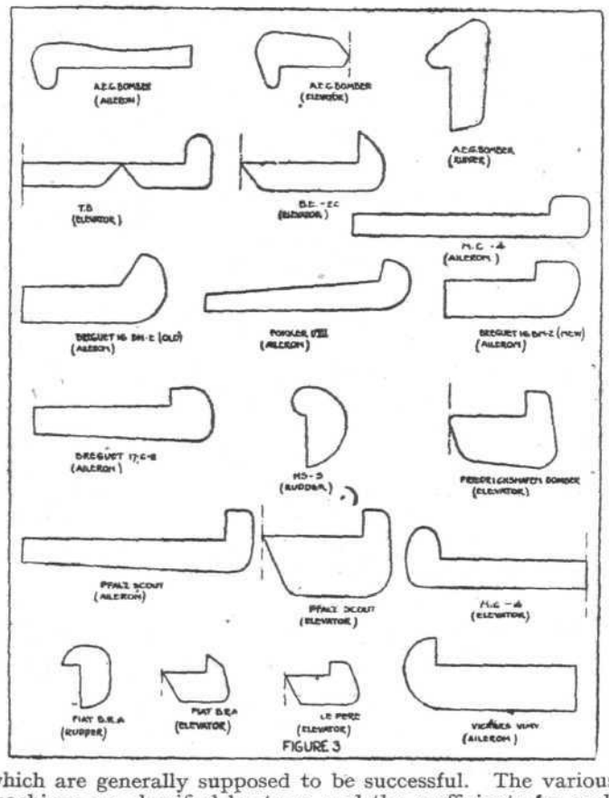


FIGURE 3

which are generally supposed to be successful. The various machines are classified by type, and the coefficients for each type are averaged in Table I of Appendix III. It is interesting to note that the average coefficients for very different types are practically the same. The coefficients for the individual machines vary more widely and reflect the individuality of the designers. In particular, the average for 15 German aeroplanes shows an *aileron* area only eight per cent. of the wing area, while the averages for Table I lie between 11 and 13 per cent. It must be that the Germans did not desire a powerful lateral control.

Table X of Appendix III shows similar coefficients for the control surfaces of airships. Here we have less uniformity, and it would appear that airship designers had not yet settled upon simple rules. However, experience with airships is still relatively limited when we consider the immense numbers of aeroplanes that have been built.

Turning now to the proportioning of the control surfaces ; both experience and wind tunnel experiment teach that the best control surfaces are narrow trailing portions of fixed surfaces. This makes for simplicity both structurally and aerodynamically. But a difficulty arises in large machines where it is necessary to balance the surfaces to relieve the load on the pilot. I know of nothing more embarrassing than to have a balanced *aileron* or elevator flutter violently in flight, unless it be to have the balancing portion twist off entirely.

The aeronautical engineer needs some simple rule for the design of balanced control surfaces. It is not practicable to make elaborate wind tunnel experiments for every design and it is not safe to depend too much on judgment. In order to use simple rules, aeroplane designers must adopt forms which lend themselves to simple computations. Many of the forms of balancing in common use are aerodynamically entirely indeterminate. For example; consider the types of balancing shown on Fig. 2 of Appendix III. No man can calculate with confidence the force of the air spilling off a wing tip and striking an overhanging portion of *aileron*. There is certainly a vortex there of a most uncertain nature. Similarly, in the so-called "dove-tail" method of balancing, where the balancing portion of the control surface works in a recess in the fixed fin, there is a mutual reaction between the two surfaces which is highly indeterminate. The Zeppelin rudders have until recently had this form of balance, but I have noted with satisfaction that the "Bodensee" has changed to a partially overhung type of rudder.

TABLE XI

Machine.	Control.	Balancing Moment. / Righting Moment.	
A.E.G. Bomber ..	*Aileron* ..	0·50	
A.E.G. Bomber ..	Elevator ..	0·43	
A.E.G. Bomber ..	Rudder ..	0·40	
T.B.	Elevator ..	1·00	(wind tunnel tests show indication of instability)
B.E.-20	Elevator ..	0·64	(wind tunnel tests show proper degree of balance)
N.C.-4	*Ailerons* ..	0·58	
Breguet 16 BN-2 (old)	*Ailerons* ..	0·83	(wind tunnel tests by Eiffel (Résumé 1919) show degree of balancing in order shown)
Fokker D-VIII ..	*Ailerons* ..	0·45	
Breguet 16 BN-2 (new)	*Ailerons* ..	0·37	
Breguet 17-C-2 ..	*Ailerons* ..	0·22	
HS-3	Rudder ..	0·47	
Friedrichshafen Bomber	Elevator ..	0·40	
Pfalz Scout.. ..	*Ailerons* ..	0·65	
Pfalz Scout.. ..	Elevators ..	0·25	
N.C.	Elevators ..	0·63	
Fiat B-R-A ..	Rudder ..	0·55	
Fiat B-R-A ..	Elevator ..	0·36	
Le Pere	Elevator ..	0·26	
Vickers Vimy ..	*Aileron* ..	0·20	

The naval architect has long ago been through similar troubles with ships' rudders in rear of the dead wood aft, and concluded that he would use a plain trailing rudder hinged to the stern post with an underhung balancing portion projecting into clean water. The dead wood is cut away forward of this balancing portion. Spade rudders are used where they cannot influence the dead wood or be blanketed by it.

If aeronautical engineers would agree to use simple overhung balanced control surfaces, a simple calculation will serve for their design. Table XI of Appendix III summarises a calculation for such control surfaces on a number of machines where the centre of pressure of the trailing portion is taken at 0.3 chord length and for the overhung portion at 0·2 chord length. The ratio of balancing to righting moments gives a coefficient which for the normal case free from blanketing or slip stream effects should not exceed 0·65.

To sum up, control surfaces of the usual type can be designed by use of coefficients taken from similar type machines of normal behaviour with every assurance that the manœuvrability of the new design will prove normal.

Abstract of Appendix IV

Normand's Weight Equation (Rigid Airships).—There is nothing more profitless than an argument over a proposed design between the operating personnel, who are always demanding enhanced military characteristics, and the constructors, who are prone to object to change on the grounds that their pet design will be spoiled. Most likely both sides advance very strong arguments to support a particular view of the matter. But such a discussion should not rest on a

basis of argument alone else it degenerates into something resembling that ancient impasse: "Are the mountains better than the seashore?"

As a matter of fact, the effect of any proposed change in military characteristics can be calculated in a sufficiently approximate manner to make possible a decision based upon evidence.

For rigid airships which closely resemble vessels, I propose the use of a naval architect's method for analysing such problems due originally to that eminent French designer of torpedo craft, M. Normand, and subsequently extended and perfected by Prof. Hovgaard. By Normand's method, a rapid estimate can be made of the cost in displacement involved by almost any proposed change in the ship.

In the fourth appendix to this paper, I have developed Normand's method to apply to airships by forming the so-called weight equation as the sum of the principal weight groups each expressed in terms of the independent and dependent variables of the design. This weight equation is then differentiated to exhibit the effect of a change in any of these variables and formulæ deduced, analogous to those which apply to vessels, by which a quantitative estimate can be made for the effect of such change.

An airship can be changed in two ways, by preserving similitude of form and permitting the volume to vary or by holding constant volume and changing the ratio of length to diameter. Considering the first case, the factor of proportionality N computed in the fourth appendix is about 4·5 for a ship of L.49 type. This means that an addition of 1,000 lbs. to the weight of any item in the ship calls for such increase in other items, to keep the performance the same, that the total lift must be increased 4,500 lbs. For battleships N is of the order of only 2·5, indicating a much more favourable situation. The principal reason airships appear to be at a disadvantage comes from the longitudinal members of the hull structure whose weight increases as the fourth power of the length of the ship.

Consider, now, the effect of holding volume constant and changing the fineness of the ship. The longitudinal members of the hull vary in weight as the third power of the length and the first power of the diameter, while the weight of the transverse frames varies as the fourth power of the diameter. If the ship be fattened up, weight is saved on the longitudinals and lost on the transverses. But if the ship be too long originally there will result an important nett saving in weight.

Finally, I have applied the method to a rigid airship of the Zeppelin type (L.49) in an example to show how practical answers may be obtained. The displacement of L.49 is assumed to be 1,940,000 cu. ft., or 129,800 lbs. If it be proposed to make a new design which shall be similar to L.49, except to have 2,000 lbs. more bombs, a 25 per cent. heavier outer cover, a 15 per cent. more speed, the new ship must be given 13,890 lbs. more displacement, or a total volume of 2,145,000 cu. ft. The net price paid in displacement is, therefore, about six tons.

On the other hand, if the ratio of length to diameter be reduced from 8 to 7, the ship can be built lighter, and the calculations show that a saving in the new design of nearly five tons is due to this change of form alone. As a final result a new ship resembling L.49 might be built having the proposed changes incorporated, and only be slightly larger than L.49; *i.e.*, 1,990,000 cu. ft. The principal dimensions compare as follows:—

Length L.49, 634 ft., new ship 584 ft.
Diameter L.49, 78·7 ft., new ship 83·5 ft.

It would appear that a decrease in the length diameter ratio is of great advantage, and were it not for the necessity to consider the height of existing hangar door, airships might well be made fatter than the German models.

Normand's Method

Normand's weight equation

$$= W_A + W_B + W_C + \text{etc.} = \Sigma W_z \qquad (1)$$

A typical member of the weight equation is

$$W_z = kL^x D^y \alpha^z \beta^w \text{ etc.} \qquad (2)$$

or where ratio L/D is constant

$$W_z = kL^x \alpha^z \beta^w \text{ etc.} \qquad (3)$$

$$\text{and } W = kL^3 \qquad (4)$$

After differentiating (4), $\frac{\Delta W}{W} = 3\frac{\Delta L}{L}$ (5)

After differentiating (3), $\frac{\Delta W}{W_z} = x\frac{\Delta L}{L} + z\frac{\Delta \alpha}{\alpha} + \text{etc.}$ (6)

After substituting (5) in (6)

$$\Delta W = \Sigma \Delta W_z = N \Sigma W_z \left(z\frac{\Delta \alpha}{\alpha} + \text{etc.} \right), \qquad (7)$$

$$\text{Where } N = \frac{1}{1 - \Sigma \frac{x W_z}{3W}} = 4{\cdot}67 \text{ for L-49}$$

If weight variables and volume are constant and L/D only changes

$$W = kLD^2 \text{ and } \frac{\Delta W}{W} = \frac{\Delta L}{L} + \frac{2\Delta D}{D} = 0 \qquad (8)$$

$$\frac{\Delta W_z}{W_z} = x\frac{\Delta L}{L} + y\frac{\Delta D}{D} \qquad (9)$$

$$\text{and } \Delta W = \Sigma \Delta W_z = \frac{\Delta L}{L} \Sigma W_z \left(x - \frac{y}{2} \right)$$

$$= 14{,}770 \frac{\Delta L}{L} \text{ for L-49.} \qquad (10)$$

	Ft.	Ft.	Cu. ft.
Original	L. 643	D. 78·7	1,940,000
Plus additional 2,000 lb. bombs	L. 657	D. 80·5	2,080,000
And 25 per cent. heavier cover fabric	L. 665	D. 81·5	2,145,000
And 15 per cent. saved on longitudinals and main transvers s	L. 650	D. 79·6	2,008,000
And 5 per cent. more speed ..	L. 665	D. 81·5	2,145,000
And length/diameter reduced from 8 to 7	L. 584	D. 83·5	1,990,000

(To be Concluded)

COMMERCIAL AVIATION IN NORWAY

IN the report on the Commerce and Industry of Norway down to the end of the year 1919, Mr. C. L. Paus, commercial secretary to H.M. Legation, Christiania, states that there was on December 31, 1919, only one company in Norway whose object it is to carry on air traffic on a commercial basis. The name of this company is Det Norske Luftfartrederi A./S., Christiania.

"No air service has as yet actually been commenced, and the date of its commencement depends upon the attitude of the Norwegian Government towards an application made by the company for financial assistance. The Norwegian Ministry of Commerce have been petitioned to make a grant of Kr.1,200,000 to be applied to the initiation and operation between May 1, 1920, and June 30, 1921, of an air service from Christiania *via* Kristianssand S. to Stavanger, and from Christiania *via* Göteborg to Copenhagen. It appears, however, that the Ministry are unwilling to recommend the grant of a larger sum than 60,000 kroner for the period in question, and if this decision is maintained it is, therefore, improbable that air traffic will be opened during 1920. In any case, it is unlikely that operations will pass beyond the experimental stage during the coming year. It is understood that the company have not yet purchased any aeroplanes, and that they are not altogether unwilling to postpone their operations on the ground that commercial aviation is still in its infancy."

R.A.F. Marriage Allowances

BY the Air Ministry Weekly Orders, dated July 19, the separation allowance, dependant's allowance, and special parents' allowance to the families of married airmen of the Royal Air Force are discontinued. In substitution for them marriage allowances are to be issued. In the case of airmen who extended their service in the Royal Air Force under the terms of the Order of January 3, 1919, or re-enlisted in the Royal Air Force under the terms of the Order of May 10, 1919, the new Regulations shall not apply to such of them as retained during their present engagement a reserved right to the continuation of Army separation allowance, allotments of pay, and family allowance.

With effect from September 30, the rates of marriage allowance will be as follows:—(*a*) For a wife, 9*s.* 6*d.* per week; wife and one child, 19*s.*; wife and two children, 26*s.* 6*d.*; wife and three children, 32*s.*; for each additional child, 3*s.* (*b*) For children where no allowance is admissible for a wife—First child, 9*s.* 6*d.*; second child, 7*s.* 6*d.*; third child, 5*s.* 6*d.*; each additional child, 3*s.* The rates of marriage allowance will vary annually according to the index figure for the cost of living as published by the Ministry of Labour. Marriage allowance is normally issuable for the wives and legitimate children or step-children of—(*a*) airmen who have attained the age of 26 years; or who are over 26, now serving and already married.

FLIGHT

AIRISMS FROM THE FOUR WINDS

WE are getting a step nearer to that Territorial Air Force. It appears now to be known that the report upon the subject has been drawn up and is in the hands of the Secretary for War. One great doubt arises. Has the matter, even if brought into being in the near future, been left overlate to ensure the immediate success which an earlier launching of such a scheme would otherwise have been? We hope not, but there is a great deal in the remarks of a critic who writes that one of the main difficulties to be faced is that so many of the officers of the R.A.F. who would like to join a Territorial Air Force are now engaged in other occupations, and have little chance of gaining further flying experience. Mechanics, too, who now can earn very good wages at engineering, are not inclined to give up this good pay for camp.

The report, it is stated, proposes a short course of flying instruction for ex-officers, and that means should be taken to train unskilled men as possible air mechanics.

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THE authority who last week alleged that aeroplanes were being supplied mysteriously to Sinn Feiners—who, dressed in British uniforms, bombed certain camps in the West of Ireland—now supplements his news with the information that the authorities are on the trail of a certain individual who is believed to be the "supply officer" on this side.

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IT is sad that such fearless men as Lieuts. Locklear and Elliott, the cinema aerial "stunters," should have passed in their checks whilst thus "at work," but what could have been reasonably expected from such utterly foolhardy monkey tricks? The pity of it is that public taste should be diagnosed by the cinema folk as requiring this outrageous sort of performance. There might be a good deal worse "League" started, than one to systematically hiss down films recording this type of suicide.

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A VERY human document has been given the light of day by our French contemporary *L'Illustration* in connection with the air tragedy of the Sahara desert which we reported some months ago. It is a report by Marcel Vaslin, one of the two French airmen who accompanied General Lapperine on the flight to Timbuctoo (West Africa), in February, when the party had to make a forced landing in the Sahara. Their first thought after the forced landing on February 18 was to rescue the water, and next day the general decided that they should start for the mountains of the Adrar. The two airmen loaded themselves up with provisions and water, and the three agreed to ration themselves to 1½ pints of water a day each.

The going was terribly hard, their feet sinking 4 ins. into the hot sand, and the sun was terrible. They marched at intervals until the afternoon of February 20, when they reached a little height in the sand, and, looking out, saw nothing but the desert stretching out in front of them, and no sign of the mountains. The general anxiously consulted his maps, "but," says Vaslin, "we read in his face that we were lost."

It was then decided that they must return to the aeroplane. All three men were growing weaker, and the general suffered greatly. They reached the aeroplane again after three days' march. They rigged up a tent and recovered 6 gals. of water from the radiator, leaving 6 pints in it as a reserve stock. So they remained until February 29. On that day Marcel Vaslin made his will and signed it "Marcel Vaslin, whom Fate is leading to God." Once or twice a gazelle appeared, at which they shot, but without effect. The recurrent sand-storms added to the horror of their existence.

The two men then tried to reach the military post at Tin Zaouaten, which they reckoned to be 85 miles away, but Bernard collapsed almost at once, and, with despair growing in their hearts, they returned to the general, who had consented to their departure. Lapperine was by now obviously dying. "On March 4," says Vaslin, "we saw vultures circling round us croaking. They scented that one of us was about to die." The general died the next day. Before his death he said: "My children, people think I know the desert, but nobody knows it. I am the cause of your misfortune. I have crossed the Sahara ten times. On this, my eleventh trip, I shall stay here."

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By March 10 the airmen had consumed the last of their provisions. The diary says: "Bernard ate some glycerine which the general had in his valise. I ate toothpaste, which made me very thirsty. We also took a few pastilles. We reduced our consumption of water to 1 pint a day between the two of us.

"On March 12 Bernard wanted to make an end of it, and proposed it to me. I tried to restore his *moral*."

Next day Bernard insisted on suicide more imperiously than before. "We drank the last of the water. Bernard got out of his valise two razor blades. We took one each, but beforehand we put two receptacles beside us to catch our blood so that we might drink it and thus still our thirst for the last time before we died. Bernard, the more courageous, made the first start. With the razor blade he made a pretty deep wound in the artery of his left wrist.

"I had just begun to wound myself also, but seeing that no blood came from Bernard's wound I refrained. My poor comrade got very angry. He threw away the blade, and I did the same. Then he said: 'We'll do it tomorrow with our three last cartridges.'

"Very early on the morning of March 14 I heard Bernard say: 'I still have a little hope left.' On this I pulled the blanket over us again. We did not sleep, but we reflected. An hour had scarcely passed when I heard the bray of a camel. At this some unknown force gave me strength. I seized the carbine and fired three shots. . . . "

Lieutenant Pruvost, head of the party which had providentially stumbled on the missing men, explained that he was not looking for them, but was going to Agades for rations.

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WE are just wondering whether the victim of the following ghastly example of bureaucracy was an R.A.F. man:—

"A strong protest has been made, writes the Guildford *Evening Standard* correspondent, to the Ministry of Pensions by the Surrey County War Pensions Committee regarding delays in awarding pensions to disabled men and their dependents, and in sanctioning treatment. The worst of a long list of cases cited was that of Corporal Oliver, a Farnham man, taken ill six months after demobilisation. This is its tragic history:—

"May 22.—Case considered by Surrey Committee, and forwarded to department with request it should be dealt with.

"June 4.—Further request to department that Oliver should be examined as soon as possible.

"June 15.—Request by committee for reply to two previous letters.

"June 17.—Further urgent request for reply.

"June 29.—Request that man be examined, as he was not expected to live.

"July 1.—Request for instructions by return of post.

"July 6.—Department at last take action—District Controller of Medical Services (Guildford) visits man's home and finds that he is dead.

"The chairman of the Surrey Committee (Lieut.-General Sir Edmond Elles) and members expressed the opinion that the delays were due to over-centralisation by the Ministry, and insufficient decentralisation to local committees, and also to the difficulty in getting any one department to give a definite ruling on a case."

CIVIL AVIATION—OCTOBER, 1919, TO MARCH, 1920

IN our issue of July 8 we gave some extracts from the half-yearly report of the Controller-General of Civil Aviation, dealing with progress at home and abroad, but pressure on our space due to the Olympia Show prevented publication at full length at the time. We are now able to supplement this with some further notes.

It is pointed out when the Air Navigation Act is passed, the existing regulations will be replaced by new ones issued by Order in Council. The Report goes on to state that advantage will be taken of this opportunity to modify those details in the existing Regulations which experience has shown to be defective, and to incorporate in the new Regulations such alterations as have been effected during the past twelve months.

These alterations may be summed up as follows :—

Prohibited Areas—The number of these has been largely reduced and partial prohibition—restricting the height at which flying over these areas may take place—has been substituted for complete prohibition.

Customs Examination—All aircraft—and not solely those carrying goods or passengers—are now required to obtain Customs clearance before leaving the United Kingdom.

Fixed Balloons—The special restrictions in regard to these are now only applied at localities within five miles of an aerodrome.

Parachutes—The safety regulations affecting the dropping of articles from the air have been amended to permit of packages being dropped by parachute under certain conditions.

In addition to the incorporation of these modifications the new regulations include clauses to regulate aerial light-houses and prevent confusion with neighbouring lights when night-flying develops, and to provide for pilots' log-books. The obligation of possessing a certificate of airworthiness will also be extended to all except experimental aircraft. Separate regulations will be issued in regard to the investigation of accidents.

The crystallisation of the detailed procedure for administering the regulations has continued satisfactorily, and with the assistance of the Industry the work of laying down a sound technical basis for the regulations concerning the safety of aircraft has attained a considerable measure of success. A definite step forward has been gained as a result of the recommendations of a Sub-Committee of the Advisory Committee for Aeronautics appointed to report as to the load factors to be used in the design of civil aircraft, and agreement has been reached on the tests to be undergone by engines for use in civil aircraft. It is anticipated that the Report on Load Factors and the Schedule of Engine Tests will not only prove of value to those concerned in Great Britain and the Dominions, but will also serve as a basis for discussion as a result of which international agreement on the subject may eventually be secured.

Arrangements have been made with a view to simplifying the procedure for the attendance of the members of the crew of an aircraft for the purpose of medical examination, and a pamphlet has been published detailing the methods and standards now in use for the medical examination of pilots.

In first examinations it is necessary to secure a type of individual most likely to withstand the stress of daily flying. Re-examinations are necessary in order to ensure that the original physical condition has not dangerously deteriorated, either as a direct result of flying, or in consequence of debilitating illnesses. The special tests that have been devised to estimate flying stress and air fatigue are yielding useful and satisfactory information of the effects of civil flying upon the individual.

Since these tests require considerable technical skill, both in their application and interpretation, it has been decided that they should be carried out as far as possible by the same individual. The medical examinations are also useful in that they help to increase the confidence of the public in the efficiency of the pilot, while the confidence of the pilot in himself is materially assisted by the knowledge of his own physical fitness.

Ground Organisation—The State has assumed the task of providing and organising key aerodromes, assisting navigation by various methods, and instituting a wireless system for the distribution of meteorological and other information. In these directions a considerable advance has been made during the past six months.

Numerous sites for Emergency Landing Grounds throughout the country have been inspected, and 114 have been found suitable. Enquiries are in progress to ascertain whether tenants are prepared to conclude agreements permitting the use of their land for this purpose.

In view of the anticipated development of the seaplane and flying boat for commercial use, especially for traffic across the North Sea, arrangements have been made to take over one slipway, office accommodation and a number of mooring buoys and sheds at the permanent R.A.F. seaplane station at Felixstowe.

Considerable loss of time is entailed in transit to and from aerodromes, which are at present necessarily situated some miles outside large towns. Where a river passes through a town, this waste of time can be obviated by the provision for seaplanes of an alighting area on the river as near the centre of the town as possible. A scheme drawn up after careful investigation for the utilisation of certain stretches of the Thames in the London Area by this type of aircraft is now being discussed by the various Government and municipal authorities concerned.

A considerable amount of work has been done in assisting navigation. Names have been marked on the roofs of the railway stations at Ashford, Hitchin, Redhill and Tonbridge ; and a preliminary survey has been made for the purposes of marking by other inexpensive methods the names of important towns on air routes where the marking of stations is not feasible.

Experiments have accordingly been carried out at Andover on aerial lighthouses, flares and landing lights for the purpose of deciding upon the best methods of assisting navigation at night.

Another important step towards facilitating navigation has been the compilation of text-books, maps and charts, including the first edition of an " Aerodrome Book," which, with its maps, will form a comprehensive guide to the situation and organisation of all aerodromes and landing grounds in the British Isles. A gazetteer, with maps of the world's aerodromes and aerial routes, and an official text-book on air navigation are also in preparation, and proposals for a standard equipment of charts for navigation by direction-finding wireless telegraph are being considered. Arrangements have been concluded with the War Office and Admiralty for all charts and maps to be executed by the Geographical Section of the General Staff.

All available information, embracing methods of navigation, the use of navigating instruments and the routes to be followed, has been collated for the assistance of pilots undertaking long-distance flights from England to India, Australia, Cape Town and various foreign countries, and from Holland to Java.

A complete W/T network for the assistance of meteorology and aviation, both service and civil, is being organised in the United Kingdom. As part of this system, W/T stations are being erected at the civil aerodromes at Croydon, Castle Bromwich, Didsbury and Renfrew.

In co-operation with the authorities concerned, arrangements have been made for the improvement of W/T communication on the civil routes between this country, France and Belgium. The transmission and receipt by wireless of Meteorological Office reports to and from other countries have been facilitated.

With regard to radio telephony, five stations in the United Kingdom have been fitted with R/T apparatus for the use of civil aircraft, and arrangements with France are near completion for the erection of R/T stations for the air services between that country and England.

It is also proposed to assist aerial navigation by means of wireless direction-finding, especially for the purpose of overcoming the difficulties presented by fog, mist and clouds, and equipment for this purpose has been installed at Croydon. Arrangements are being made for a similar system in Paris and Brussels.

A difficult and intricate problem is that of systematising the wave-lengths in use throughout the world, but proposals have now been put forward by the Department of Civil Aviation to the Government Departmental Committee sitting at the G.P.O. for the purpose of formulating a British draft " International Radio Convention " ; these proposals, which are still under consideration, while accepting the principles of the International Commission lately held in Paris, have set out a definite world-wide scheme of wave-lengths on which the future policy of world wireless would depend.

The Signals Branch of the Department is reorganising the R.A.F. wireless and land line equipment and personnel according to peace establishment, and is reducing the number

of service W/T stations and land lines from a war basis to that sufficient for peace requirements.

Tables for visual signalling have been compiled and issued, and a syllabus for visual training has been published.

Imperial Air Routes—On the Cairo-Karachi route the wireless and land line systems have been improved; Cairo and Bushire have been connected by W/T, with intermediate stations at Ramleh, Baghdad and Basra; and the equipment of Karachi, Bandar Abbas, and Chahbar with W/T stations is now being taken in hand. There are, in addition, minor stations equipped with comparatively short-range apparatus at various places along the route.

Considerable importance attaches to the establishment of an aerodrome at Malta as a link between England and Egypt. The section of the route between St. Raphael and Pisa is not satisfactory, and an alternative line *via* Corsica and Sardinia to Malta, which would have the advantage of utilising one of the few British possessions in the Mediterranean, has been under consideration. A site for an aerodrome at Malta has been selected, and operations have been carried out which prove that the outcrop of rock which presented the chief obstacle can be removed at a moderate cost.

Meteorology—The Headquarters of the Meteorological Office were transferred from South Kensington to the Air Ministry on November 18, 1919, and all the Government meteorological agencies, including the Marine, Statistical, and Instruments Divisions, and the British Rainfall Organisation, are now co-ordinated under the Department of Civil Aviation, which is responsible for, and bears the cost of, the meteorological service of Great Britain, not only in regard to aviation, but to the development of the science of meteorology as a whole.

An important problem, which is in process of solution, is the completion of arrangements for the issue of the full data for synoptic charts, envisaged in Annex G of the International Air Convention. This has been delayed, partly owing to the necessary preparation of very detailed instructions to the primary reporting stations, mainly staffed by coastguards, and partly owing to the need for co-ordinating the code for the reports for land and sea, which was not completed in Annex G.

The provision of meteorological information for night-flying marches hand in hand with the general development of the meteorological *réseau*. Knowledge of the upper winds will enable compass bearings for flights up to 150 miles to be set out with accuracy beforehand, and the co-ordination of the synoptic chart with the local observations of temperature and humidity will enable the Meteorological Department to provide valuable data in regard to night-flying.

Insurance—Lloyd's have decided to undertake the systematic collection of information for purposes of aviation insurance, and the information collected will be circulated to their members in a confidential record. The Department of Civil Aviation has promised to give them any assistance in their power.

Research—The Research Department and the Department of Civil Aviation have co-operated in producing, in conjunction with the manufacturers, new types of recording and measuring instruments for the Air Ministry Competitions, which according to the rules must be of British manufacture.

Progress has been made with the development of the various types of turn indicators, which are now being used to enable aircraft to fly safely in and above clouds.

The development of the R.A.E. sextant, the aperiodic compass, bearing plates and navigational flares for use at sea, facilitate the methods of checking dead reckoning for air navigation.

Attention is being paid to the design of all-metal machines.

The Dominions, India, and the Colonies—The Governments of Australia, Newfoundland and New Zealand have approved the ratification of the International Air Convention as soon as such a course is considered advisable.

Australia—The body which at present deals with aviation is a Committee of the Prime Minister's Office, called the "Air Services Committee." No air regulations have as yet been drawn up by the Commonwealth Government, but it is understood that the whole question of the administration of civil aviation is now under consideration.

A number of demonstration flights are being conducted by ex-members of the Royal Air Force, and a gift of one hundred aeroplanes has been accepted from the British Government.

*Canada**—The Air Board Act was passed in January, 1919, instituting an Air Board consisting of not less than five and not more than seven members, to be appointed by the Governor-General in Council. The functions of the Board, which has been reconstituted under the Chairmanship of the Minister of Militia and on which the Naval Service is represented, are similar to those of the Air Council in Great Britain. The Board includes a Superintendent of Flying Operations, responsible for all civil aviation undertaken by the Government, and a Superintendent of Certificates, who controls the licensing of personnel, aircraft and air harbours, and is responsible for civil aviation conducted by private enterprise.

The Associate Air Research Committee, which held its first meeting on February 7, has been formed under the Honorary Advisory Council for Scientific and Industrial Research, and will work in close co-operation with the Air Board. The co-operation of the Meteorological Office and the General Superintendent, Government Radio-Telegraphic Service, has also been secured.

Dangerous flying was prohibited by Order in Council on July 7, and regulations governing civil aviation, and based on the International Air Convention, were published on January 17, 1920.

The Air Board is giving consideration to the special uses to which aircraft can be put in Canada, such as forest patrol and survey work; and authority has been obtained to carry out experiments in photo-topographical surveying in the province of Quebec.

India—The ban on civil aviation has been removed, and an Air Board has been set up under the administration of the Department of Commerce and Industry. Its functions are advisory, executive authority for carrying out its decisions being vested in the Department's Member in Council.

The Indian Aircraft Act of 1911 empowers the Governor-General in Council to make regulations governing civil aviation. In accordance with these powers, in December, 1919, regulations based on those in force in Great Britain were published in draft by the Department of Commerce and Industry, and are now in operation.

New Zealand—An Act entitled "The Aviation Act of 1919" was passed in December 1918, and empowers the Governor-General to make regulations by Order in Council as to the issue of licences to flying schools and pilots, the registration of aircraft and prohibited areas.

South Africa—Civil aviation is temporarily under the control of the Department of Railways and Harbours, but on January 25, 1920, a conference was held to consider the best method of controlling and developing civil aviation in South Africa, and the whole question is now under consideration by the Union Government.

The Government is fully alive to the importance of aviation, and has already offered to take over the aerodromes on the Cairo to Cape Town route situated within its territory.

West Indies and Bermuda—A strong combine of British firms is considering plans for the establishment of air services in the West Indies and Bermuda and its proposals are receiving the attention of the Colonial Governments concerned.

The legislature of the Bahamas has passed a Bill for the provisional regulation of air navigation, and the grant of concessions to a company undertaking an air mail and passenger service between the Bahamas group of islands and between those islands and Florida has been under consideration.

* The High Commissioner for Canada signed the International Air Convention on April 13, 1920.

(To be Concluded)

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Aeroplane Guard for General Lucas

AN aeroplane guard was among the precautions against Sinn Fein activity when General Lucas left Tipperary on July 30. Just before the car containing the General left an aeroplane flew over from Fermoy and appeared to drop messages, then looped the loop and returned to Fermoy. It was followed by a second machine, which acted as scout to the General's escort.

The Patent Situation in the U.S.

THE cabled reports of the action of the Wright Aeronautical Corporation, owner of the Wright aeroplane patents, against the Interallied Aircraft Corporation, have resulted in misunderstanding as to the right of the Interallied Aircraft to sell its Avro and Sopwith aeroplanes. The decree of the court in that suit did prohibit the further sale or use of these machines, but the Interallied Aircraft Corporation has made an agreement with the Wright Aeronautical Corporation so that all the 'planes which the former concern is selling are licensed under the Wright patent, and the Interallied Aircraft Co. has the absolute right to sell them.

No purchaser or user of the aeroplanes sold by the Interallied Aircraft Co. has any reason to apprehend any legal difficulties with respect to the Wright patent. This agreement does not protect purchasers or users of unlicensed foreign aeroplanes.

THE ROYAL AIR FORCE

London Gazette, July 27

Flying Branch

Pilot Officers to be Flying Officers.—F. F. Tattam (since demobilised); Aug. 23, 1919. A. J. Mantle (since demobilised); Dec. 7, 1919. Pilot Offr. G. E. Durrance (O.) to be Obs Offr. (since relinquished commn.); Oct. 1, 1919. Pilot Offr. (Hon. Flying Offr.) H. O. F. B. Blew (Lieut. R. Suss. R.), relinquishes his temp. R.A.F. commn. on return to Army duty; Nov. 11, 1919.

Transferred to Unemployed List.—Lieut. J. W. Young; Jan. 18, 1919. Lieut. H. L. F. McLean; April 9, 1919; Lieut. (Hon. Capt.) C. F. Keller; July 24, 1919. Sec. Lieut. G. D. Wilson, Sec. Lieut. F. Wroth; Aug. 7, 1919; Lieut. E. Stanton; Sept. 26, 1919. Lieut. E. S. Farrand; Oct. 1, 1919. Sec. Lieut. F. C. Williams; Oct. 9, 1919. Sec. Lieut. W. L. Webb; Oct. 10, 1919. Lieut. H. Gledhill; March 27. Lieut. A. J. Mantle, D.F.C.; June 26 (substituted for notification in *Gazette* of July 9).

The following Lieutenants relinquish their commns. on account of ill-health caused by wounds, and are permitted to retain their rank.—J. B. Cockin (substituted for *Gazette* of June 18), H. B. Hewat; July 20.

The following Sec. Lieuts. relinquish their commns. on account of ill-health caused by wounds, and are permitted to retain their rank.—H. F. Mulhall; July 17. W. Goffe; July 22.

The Christian names of Charles Rowland Fenton, M.C. (temp. Lieut., R.F.A.) are as now described, and not as *Gazette* of Nov. 1, 1918.

Administrative Branch

Lieut. J. C. Andrews to be Lieut. from (A. and S.); May 5, 1918 (substituted for notification in the *Gazette* of May 4).

Pilot Officers to be Flying Officers.—F. C. Matten; Oct. 1, 1919 (since demobilised). A. C. Cunnison; Nov. 1, 1919. E. Powell; Jan 9 (since demobilised). Sec. Lieut. A. Jukes, M.B.E., to be Sec. Lieut., from (T.), from May 2, 1919, to July 12, 1919. Flying Officer F. Stedman (Capt. I.A.R.O.) relinquishes his temp. R.A.F. commn. on reversion to I.A.R.O.; March 21, 1919 (substituted for notification in the *Gazette* of May 6, 1919, wherein this Officer was described as S. Fremlin). Lieut. F. Worswick relinquishes his temp. R.A.F. commn.; June 16, 1918.

Transferred to Unemployed List.—Capt. C. G. Briggs; Aug. 5, 1919. Lieut. E. Powell; March 14 (substituted for notification in the *Gazette* of March 26). Lieut. H. J. Grant; March 25 (substituted for *Gazette* of April 16). Sec. Lieut. C. L. Helsdon; March 31. Lieut. H. E. Davies; April 1 (substituted for *Gazette*; April 20. Capt. (actg. Maj.) W. M. Urquhart relinquishes his commn., and is permitted to retain the rank of Maj.; April 13, 1919 (substituted for *Gazette* April 15, 1919). Sec. Lieut. J. G. Le Brun relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain his rank; July 4. Sec. Lieut. R. T. Barton relinquishes his temp. R.A.F. commn.; July 16. The notification in *Gazette* of May 21, 1918, concerning Sec. Lieut. E. G. Brett is cancelled (substituted for *Gazette*, June 17, 1919).

Technical Branch

Flight Lieut. G. L. Hunting to be Flight Lieut., Grade (A.), from (S.O.); Feb. 17. Flying Officer F. N. Trinder is graded for purposes of pay and allowances as Flight Lieut. whilst employed as Flight Lieut., Grade (A.) from Sept. 15, 1919, to March 31 (substituted for *Gazette*, July 20). Pilot Officer S. A. Smith to be Flying Officer Grade (A.); Oct. 1, 1919 (since demobilised).

Pilot Officers to be Flying Officers, Grade (B.).—H. J. Brown, G. Forbes (since demobilised); Oct. 1, 1919. Sec. Lieut. F. G. Buck to be Lieut. without pay and allowances of that rank; June 6, 1919 (since demobilised). Pilot Officer R. C. Higgins to be Flying Officer without pay and allowances of that rank; Oct. 1, 1919. Lt. B. J. Harper is placed on the retired list on account of ill-health contracted on active service; July 28.

Transferred to Unemployed List.—Sec. Lieut. W. G. Fairley (substituted for *Gazette*, Jan 30). Capt. A. K. Toulmin-Smith (substituted for *Gazette*, Feb. 3). Lieut. W. W. Stainer (substituted for *Gazette*, Feb. 3); Aug. 1, 1919. Lieut. F. Woombell; Oct. 15, 1919 (substituted for *Gazette*, Nov. 25, 1919). Lieut. R. A. Bell; Oct. 29, 1919 (substituted for *Gazette* Nov. 25, 1919). Lieut. V. H. Lurie; Nov. 3, 1919 (substituted for *Gazette*, Nov. 21, 1919). Lieut. F. G. Buck; Feb 20 (substituted for *Gazette*, March 19). Lieut. E. J. Williams May 20 (substituted for *Gazette*, June 8). Lieut. W. C. Ibbott (Sec. Lieut. Gen. List) relinquishes his temp. R.A.F. commn. on retirement from the Army, and is permitted to retain the rank of Lieut.; July 28. Sec. Lieut. J. P. Clark resigns his commn.; Aug. 23, 1919 (substituted for *Gazette* Aug. 8, 1919).

Memoranda

Wing Commr. J. W. O. Dalgleish, O.B.E., is restored to the active list; July 26.

Then follow the names of 12 Cadets granted hon. commns. as Sec. Lieuts.

Hon. Sec. Lieut. R. E. Mee relinquishes his hon. commn. with effect from July 22.

The notification in *Gazette*, Nov. 18, 1919, concerning P. F. O. Walter Murray Cowper is cancelled.

London Gazette, July 30

Flying Branch

Lieut. P. Q. Reiss (Lieut., Lan. Fus.), relinquishes his temp. R.A.F. commn. on ceasing to be employed; Feb. 24, 1919. Flying Officer J. E. MacLennan (Lieut., Scot. Rif.), relinquishes his temp. R.A.F. commn. on return to Army duty; Nov. 8. 1919.

Transferred to Unemployed List.—Lieut. J. W. Rayner; Jan. 17, 1919. Sec. Lieut. I. Blackburn, Capt. G. B. Carr; Feb. 23, 1919. Lieut. F. Cornish; Feb. 29, 1919. Lieut. S. L. Wilcox; March 26, 1919. Lieut. (Hon. Capt.) E. Burrows; May 10, 1919. Lieut. G. H. Wenn; May 30, 1919. Lieut. F. E. E. Villiers; June 2, 1919. Lieut. C. R. R. Sefi; July 24, 1919. Sec. Lieut. H. E. Sheffield; Aug. 1, 1919. Sec. Lieut. A. M. Knill; Aug. 17, 1919. Lieut. E. Rhodes; Sept. 18, 1919. Lieut. T. L. Gann; Sept. 19. 1919 (substituted for notification in *Gazette*, Oct. 17, 1919). Lieut. N. Burke; Oct. 11, 1919. Lieut. J. F. Blick; July 14. Lieut. C. H. Porter, Lieut. I. D. Stewart; July 23. Lieut. J. R. Milne, D.F.C., relinquishes his commn., and is granted rank of Capt.; Aug. 6, 1919 (substituted for *Gazette*, Sept. 2 (1919). Lieut. A. Connon relinquishes his commn., and is permitted to retain his rank; May 4, 1919 (substituted for *Gazette*, May 20, 1919). Lieut. M. W. Piercey, A.F.C., relinquishes his commn. on retiring, with gratuity, and is permitted to retain his rank; Sept. 3, 1919 (substituted for *Gazette*, Nov. 4, 1919). Lieut. F. G. Thompson relinquishes his commn. on acct. of ill-health caused by wounds and is permitted to retain his rank; July 24.

The notifications in *Gazette*, Nov. 4, 1919, concerning Capt. J. Mitchell, M.C.; *Gazette*, March 28, 1919, concerning Lieut. P. Q. Reiss, are cancelled.

Administrative Branch

Flying Officer C. P. V. Roche to be Flying Officer from (A.); Jan. 20. (Substituted for notification in *Gazette* of Jan. 6.)

Transferred to Unemployed List.—Sec. Lieut. G. T. Clarkson; Aug. 1, 1919 (substituted for *Gazette* Feb. 3). Lieut R. E. Martin; Oct. 9, 1919. Lieut. J. H. E. Weekes; July 13. Sec. Lieut. T. G. Cemery; July 15. Sqdn. Ldr. A. R. Woodland (Qr.-Mr. (Hon. Maj.)), King's Shrop. L.I.), having retired from the Army, and relinquished his commn., is granted the rank of Lieut.-Col.

Technical Branch

The following are granted temp. commns. as Capts., Grade (B.).—C. M. Alport (Lieut., R. Highrs.), H. C. Kinred (Lieut. Glouc. R.); April 1, 1918. Capt. A. Landen, D.S.O. (North'd Fus.) relinquishes his commn. on ceasing to be employed; April 12, 1919 (substituted for *Gazette* May 23, 1919).

Transferred to Unemployed List.—Capt. R. J. G. Crouch (substituted for *Gazette*, Jan. 30). Maj. J. R. Erskine-Murray (substituted for *Gazette*, Jan. 30); Lieut. P. G. Robinson (substituted for *Gazette*, Jan. 30); Aug. 1, 1919. Lieut. W. J. Bunting; Sept. 13, 1919. Lieut. W. D. Rhys; Oct. 9, 1919. Lieut. I. M. Gee; April 6 (substituted for *Gazette*, April 27). Lieut. R. I. Wells; May 2. Lieut. H. T. Miles; July 15. Lieut. C. Knowlson; July 21. Sec. Lieut. E. Bryant; July 26.

The notification in *Gazettes* Nov. 29, 1918, and Feb. 11, 1919, concerning C. M. Alport (Lt., R. Highrs.); *Gazette* Feb. 11, 1919, concerning H. C. Kinred (Lieut., Glouc. R.); *Gazette*, April 20, concerning Capt. G. McK. Thomas are cancelled.

Memoranda

(Then follow the names of 29 Cadets granted hon. commns. as Sec. Lieuts. and 2 Overseas Cadets granted hon. commns. as Sec. Lieuts.)

Lieut.-Col. J. Starling (Qr.-Mr. and Capt. Gen. List) relinquishes his temp. R.A.F. commn., on retirement from the Army, and is permitted to retain the rank of Lieut.-Col.; Aug. 1.

An Aeroplane Trade Mark

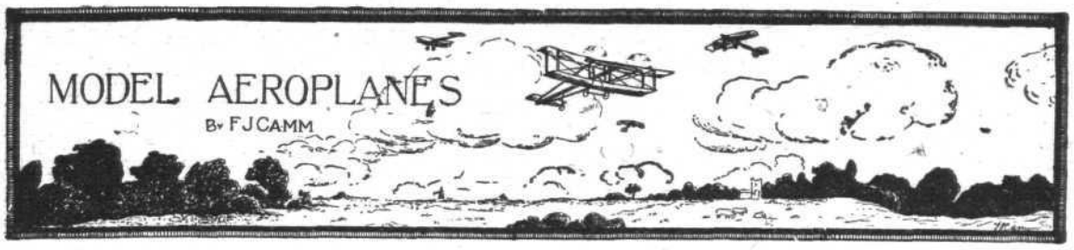
IN the Chancery Division on July 29, Mr. Justice Peterson, after hearing the action A. V. Roe & Co. *v.* Aircraft Disposal Co., Ltd., continued an interim injunction to the plaintiffs to restrain the defendant company until the trial or further order from selling or offering for sale any aeroplanes or similar goods, not being of the plaintiffs' manufacture, as Avro goods.

Mr. Douglas Hogg, K.C., for the plaintiffs, said that for some time before the War the plaintiffs had made aeroplanes and had registered the word "Avro" as their trade-mark for these goods in various classes. During the War the "Avro, 504K" machine had been a great success, and as the plaintiffs were unable to turn out sufficient of these machines, at the request of the War Office they had lent their designs and patents to be used by other manufacturers. After the War the Government had in stock a number of these machines, which they proposed to sell. The plaintiffs thereupon wrote that they must not sell as "Avro" machines those which were not of the plaintiffs' manufacture. They had a reply from the Department in June, 1919, agreeing that these machines should only be sold as "of Avro type," with a note that they were manufactured by another firm. The Ministry of Munitions subsequently sold the surplus stock of Government machines to the defendant company, which was now claiming to sell as "Avro" machines, aeroplanes which were not made by the plaintiffs, but were made to their design. The plaintiffs had no objection to the selling of the machines as "of Avro type," but the defendants, not content with that, claimed that the word "Avro" could be applied generally to this type of machine. The plaintiffs, in fact, made several kinds of aeroplanes besides the "504K," as well as seaplanes and motor-cars, all of which were identified by the word "Avro," and they might be seriously prejudiced by the sale of goods as "Avro" which were not of their manufacture. He asked for an injunction in the terms of the notice of motion until the trial.

Mr. J. Whitehead, for the defendants, said that the word "Avro" did not distinguish the plaintiffs' goods. There was no evidence that any purchaser had ever been deceived by what the defendants had done.

In giving his decision, Mr. Justice Peterson said that the Ministry of Munitions, contrary to its undertaking, had sold machines which were not manufactured by the plaintiffs, under the name of "Avro," to the defendants, and the defendants were selling them to the public. In his Lordship's opinion nobody was entitled to sell them under that name, and the interim injunction which had previously been granted ought to be continued, but so as not to prevent defendants from selling Avro 504K as "Avro type."

FLIGHT
AIRCRAFT ENGINEER AIRSHIPS



All communications to be addressed to the Model Editor. A stamp should be enclosed for a postal reply

Discussion with the Handley Page Club

ON Monday, the 19th ult., I paid a visit to the Handley-Page Club at Cricklewood, to deliver some notes on the running of a model Aero Club. (I shall be pleased to visit any other Club in London or its environs if club secretaries will fix-up a convenient time). The main points I raised were the importance of running a club on some *definite system*. It is futile to even endeavour to hold interest when no definite programme has been prepared. In this respect I mentioned that no club run for the specific purpose of merely flying model aeroplanes can hope for more than an ephemeral existence. Research work with regard to aero-foils, airscrews, and the most efficient type of machine were necessary. It was necessary for the club secretary to arrange a lecture, either by himself, or a member of the club, or an outside person, on some topic pertaining to models, at least once a month. Members who only attended when their motor-cycle was *hors de combat* should be excluded. Only the *enthusiast*, the man who is present at the club at every available moment is the person to encourage. I learned that the Handley Page Club consists of about twenty-three members, yet only seven or eight were present. The Secretary informed me that it was difficult to get members to attend regularly. The same difficulty has been experienced by other clubs, but I would point out that it is better to have a club of seven or eight satisfactory members than twenty-five who do not attend five times out of six. Such members act as a drag upon the enthusiastic ones; when they do attend it is only to criticise what has been done. I here reiterate the importance of getting rid of such members.

Again, I have found that clubs endeavour to run on too small a subscription; as has been hereinbefore mentioned, the enthusiast does not mind a reasonable subscription—and such eliminates the unsatisfactory element. While a man may belong to a club for a minimum expenditure, he is permitted to indulge his languid interest at the expense of the club's cohesion.

I also pointed out the importance of building models *logically*. It is not sufficient to build a model by thinking of a main plane with a nice plan-form, settling on the size, building a *fuselage* to suit and trying various screws and quantities of elastic in order to obtain flight. Certain well-defined proportions should be adhered to, and if a model does not achieve what it was originally designed to do, one should investigate cause and effect. The best possible results should be sought after. Too often one finds a model produced from a process of guess, overpowered to overcome faulty design. Such tactics as these are not going to place model aeroplanes on a par with model locomotives and model yachts; until some decided effort is made to follow some decided line of reasoning, little elevation can take place with the model aeroplane movement. It is interesting to note that at least *one* London club has tackled modelling from the scientific aspect (the Finsbury Park Club), and the designs of their models show a distinct break-away from flying stick design. Moreover, their performances have in many cases exceeded those obtained from flying sticks.

The Kite and Model Aeroplane Association

I HAD an interview with Messrs. Lyche, Houlberg and Bragg Smith on Thursday, 29th ult., relating to the above Association, and ere these lines appear I shall have had a further meeting with the Advisory Committee. As previously announced, there had been a meeting of the Advisory Committee in the Caxton Hall, when it was decided to revive the Association. I found that, among the older modellists there was still that enthusiasm as in pre-War days, and the fact that things have appeared dull in the model aeroplane movement may have engendered the thought that the movement is obsolescent. Such, however, is far from being the case, and the fact that so much work is still being done is one more reason for the revival of the Association. The men with the interest and enthusiasm are there; it only requires some parent body to guide their energies into fruitful channels.

America, by the way, is literally "going off the deep end" where models are concerned, and the packs of photographs frequently sent me from various parts of that country bear testimony to this. England led the way in models before the War, but America and Holland have covered much ground. The sooner we cast off this semi-torpor the better.

A Club for Liverpool?

MR. F. A. LOWE writes as follows from Manchester:—

"Will you kindly publish the following, as soon as space permits, in FLIGHT? Before the War I belonged to the Liverpool club, and am wondering if any of the old members intend to carry on. Should this letter catch the eye of either Messrs. Kilshaw, Bennet, or Tear, I wonder if they would communicate with me, as I am anxious to know if they intend continuing in any branch of modelling.

"Unfortunately, I am away on business at the moment, and unable to see them personally. As an incentive to those concerned, I would like to issue a friendly challenge, for any type of model (if it is a C.A. model, all the better) for duration, or average of three flights. The only rules I would like to suggest are that the whole of the machine, with the exception of wheels, propeller, and gears, be made by the competitor (if C.A. is used, we might include plant), unaided, and I would also prefer, personally, to have it a tractor competition only, and to make it more interesting still, of the biplane type.

"If this challenge is accepted, I could arrange to go to Liverpool to discuss it further.

"Is there a possibility of a club being reformed? Incidentally, is there anyone interested in Manchester who would care to communicate with me?

"Is it possible to publish photos, histories and drawings of record-breaking machines again, such as those made by the members of the old days, *i.e.*, Messrs. Slatter, Mayer, Coleman, Pavely, and Mr. Louch's fine models?"

[If the modellists in question will furnish particulars, we shall be pleased to publish them. Several requests for such information have already been made herein.—MODEL ED.]

Model Club for Great Berkhampsted

MR. J. C. F. WHADCOCK, 65, High Street, Great Berkhampsted, is desirous of meeting any readers living in the above vicinity with a view to forming a model club.

Some Dutch Records

(1 mile = 1.609 km. 1 yard = .92 metre)

Hand-launched.	Duration. Secs.	Distance. Metres.	Holder.	Club.
Twin pusher ..	93⅔	695	J. Lipjes ..	H.P.V.C.
Single tractor ..	41	307	J. H. W. v.d. Muelen	,,
Single pusher ..	46⅔	—	,,	,,
R.o.g. twin pusher ..	64⅔	420	,,	,,
,, single tractor	40	360	,,	,,
Hydroplane	15⅕	—	,,	,,
	25	—	A. de Vletter	Rotterdam R.M.A.C.
Compressed air model (tractor r.o.g.)	20	50	B. A. Sas ..	H.P.V.C.

The above records have been sent to me by Mr. Muelen. We should certainly be pleased to have further details of the machines and to publish them if of sufficient interest.

Replies to Correspondents

D. M. (Sheffield) and J. C. F. W. (Berkhampsted).—We replied direct.

E. W. B. (Walthamstow).—Sorry I cannot supply the particulars. Write to 51, Baker Street, London, W.

J. K. (Nazeing).—I have duly placed your communication before the proper authorities

J. C. (Oregon, U.S.A.).—I forwarded the book. Many thanks for your interesting letter. I should think there would be little difficulty in forming a club on your side.

A. B. H. (c/o Messrs. Handley Page).—Sorry I could not attend the meeting, but your letter only reached me after it had been held. Perhaps another time?

CORRESPONDENCE

SHOT SUPERSEDES SAND

[2026] In your article on the Air Ministry exhibits at the Aero Show in your issue dated July 15, you state ". . . the methods employed in testing to destruction the main plane structure, in one of which the machine, suitably supported, is inverted and the wings loaded with *sand bags* so as to produce stresses corresponding to those in actual flight."

The method referred to is that employed at the Royal Aircraft Establishment.

Sand bags have never been used for such tests at the R.A.E. Loose sand was employed at one time, but the use of this was entirely discontinued about five years ago. The bags used for loading are filled with loose lead shot, each bag being 25 lbs. in weight.

Shot bags are used for several reasons; firstly, they are much cleaner to use than sand, and, secondly, their volume for equal weights is much less than that of sand bags would be.

A full description of all methods employed in strength tests at the R.A.E. is given in Advisory Committee for Aeronautics Reports and Memoranda No. 476, "Methods employed at the Royal Aircraft Establishment for the experimental determination of the ultimate strength of aeroplane structures."

As an erroneous impression of the tests may be conveyed from your article, we should be very pleased if you would insert this correction.

W. SYDNEY SMITH,
Superintendent, R.A.E.

S. Farnborough, July 31

SIDEWINDS

MESSRS. VICKERS, LTD., Broadway, London, S.W. 1, inform us they have opened a depôt for Wales and the South-West of England at 43, Park Street, Bristol, at which address they will be glad to receive enquiries for their products.

ANYTHING in the nature of machinery in motion always has an attraction for the passerby, and the exhibit at present in the window of the premises of The Palmer Tyre, Ltd., at 119, 121, 123, Shaftesbury Avenue, London, W.C. 2, is no exception to the rule. At the present moment the Palmer Company are showing in the window a one-tenth scale working model of the Vickers Vimy Aeroplane, which, it will be remembered, made the first Atlantic Flight and the first London-Australia Flight in 1919. This particular exhibit is modelled on the bombing aeroplane, and is complete in every detail to scale, everything being carried out with most minute exactness down to the Palmer Landing Wheels and Tyres, which, it will be remembered, were fitted to every single fighting and bombing aeroplane that left the United Kingdom during the great War. This window display is worth going out of one's way to see.

A Drop from a 'Plane in a Gale

BY way of celebrating his fiftieth parachute descent, Major Orde Lees made a drop from an aeroplane of the P.O. Flygkompani, piloted by Captain K. Saunders, D.S.C., A.F.C., at Borgholm, in Sweden, on July 20, when a gale of wind was blowing at forty to fifty miles an hour and the sea was very rough.

When the aeroplane was over the flagship of the Royal Swedish Fleet, the parachutist was seen to dive. No sooner was Major Orde Lees in the water than the wind caught the parachute, which commenced towing its passenger through the water.

By skilful manipulation Major Orde Lees steered his queer craft not only into the harbour, but berthed himself successfully alongside the steamer jetty. The distance run was three-quarters of a mile at an average speed of six and a half miles an hour.

PUBLICATIONS RECEIVED

Technical Note No. 8. Duralumin. By E. Unger and E. Schmidt. National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

Report No. 78. The Limiting Velocity in Falling from a Great Height. National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

Report No. 81. Comparison of United States and British Standard Pitot-Static Tubes. National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: cyl. = cylinder; I.C. = internal combustion; m. = motors

APPLIED FOR IN 1916

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published August 5, 1920

3,398. P. CLERGET and CLERGET, BLIN ET CIE. I.C. motors of revolving radial cylinder tyre. (146,543.)

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published August 5, 1920

9,027. R. M. RUCK. Control of aircraft. (146,548.)

APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published July 22, 1920

7,101. FAIREY AVIATION CO. AND C. R. FAIREY. Floats and landing wheels for hydro-aeroplanes. (145,127.)
7,228. G. P. APPELBEE. Control of aircraft. (145,138.)
7,301. BIJUR MOTOR APPLIANCE CO. Starting apparatus for aeroplane engines. (137,801.)
7,400. T. E. PYTHIAN. Rotary I.C. engines. (145,149.)
8,474. W. S. SHEPPARD. Aircraft. (145,177.)
8,564. A. J. T. IRELAND. Airscrews. (145,180.)
10,092. F. J. WILTSHIRE. Gas-producer plants for aircraft, etc. (145,201.)
15,139. SULLIVAN MACHINERY CO. Rotary engines. (145,255.)
16,841. J. D. MACKWORTH and A. P. STARKEY. Valve-gear for balloons. (145,269.)
18,543. SOC. DES MOTEURS GNOME ET RHONE. I.C. Engines. (130,977.)
20,312. J. L. ROUTIN. Apparatus for detecting and keeping in view aerial objectives at night. (131,597.)
25,235. E. OWERS, F. C. PEARSON and A. W. BERNDT. Springs. (145,325.)

Published August 5, 1920

279. M. B. RODRIGUEZ. Rotary I.C. engines. (146,549.)
9,299. H. SCOTT-PAINE and SUPERMARINE AVIATION WORKS. Planes. (146,627.)
9,300. H. SCOTT-PAINE and SUPERMARINE AVIATION WORKS. Elevator control gear. (146,628.)
9,302. H. SCOTT-PAINE and SUPERMARINE AVIATION WORKS. Mounting of control sticks. (146,629.)
9,303. H. SCOTT-PAINE and SUPERMARINE AVIATION WORKS. Connection of planes and superstructures. (146,630.)
9,304. H. SCOTT-PAINE and SUPERMARINE AVIATION WORKS. Tail planes. (146,631.)
9,629. H. S. DIXON. Ornithopter flying-machines. (146,648.)
10,631. A. J. GRAHAM. Propulsion of aircraft. (146,664.)
10,956. A. FAWCETT. Aircraft photographic apparatus. (146,670.)
12,407. J. HAMELIN. Rotary engines. (146,679.)
12,485. N. A. THOMPSON. Alighting gear. (146,681.)
13,605. W. H. TRIPP and C. E. W. WILKINS. Indicators and recorders of drift and leeway. (146,691.)
14,307. BOULTON AND PAUL and J. D. NORTH. Metal spars. (146,697.)
15,991. C. W. GIBSON. Stabilising mechanism. (146,712.)
16,139. C. W. SNOOK. Turning means for aeroplanes when on ground. (146,713.)
18,344. F. SAGE AND CO. and C. W. TINSON. Launching and alighting gear. (146,727.)
26,599. J. J. M. A. E. SCHNEIDER. Undercarriage suspension. (146,768.)

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